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TECHNICAL REPORT

Working with Allies and Partners

A Cost-Based Analysis of U.S. Air Forces in Europe

Jennifer D. P. Moroney • Patrick Mills • David T. Orletsky • David E. Thaler

Prepared for the United States Air Force

RAND PROJECT AIR FORCE

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Preface

The U.S. Air Force conducts multiple security cooperation–building partner activities in Europe. These activities can be expensive, and a question is whether alternative ways exist to carry out these activities, possibly at less cost. This research will assist Air Force and particularly U.S. Air Forces in Europe (USAFE) leadership in assessing and costing alternative means of conducting security cooperation and maintaining relationships with allies and partners in the U.S. European Command (EUCOM) area of responsibility (AOR) with forward-based forces. The assessment uses actual cost data and assesses specific proposals for alternative means of and postures for conducting building-partnership (BP) activities with partner air forces in the USAFE AOR. The report's findings will help the Air Force and the U.S. Department of Defense (DoD) qualitatively and quantitatively evaluate these proposals and BP activities within the context of those proposals. The report is intended for USAFE and DoD but will be of interest to decisionmakers in security cooperation and related fields.

Other RAND Project AIR FORCE documents that address security cooperation and BP issues include the following:

- Jennifer D. P. Moroney, Kim Cragin, Eric Stephen Gons, Beth Grill, John E. Peters, and Rachel M. Swanger, *International Cooperation with Partner Air Forces*, Santa Monica, Calif.: RAND Corporation, MG-790-AF, 2009
- Jennifer D. P. Moroney, Joe Hogler, Jefferson P. Marquis, Christopher Paul, John E. Peters, and Beth Grill, *Developing an Assessment Framework for U.S. Air Force Building Partnerships Programs*, Santa Monica, Calif.: RAND Corporation, MG-868-AF, 2010.

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Summary

U.S. European Command (EUCOM) views building partnerships (BP) as its highest theater priority. U.S. Air Forces in Europe (USAFE) seeks to build partnerships and partner capacity in the EUCOM area of responsibility (AOR) for several reasons. First, USAFE supports integration of the North Atlantic Treaty Organization (NATO) to help ensure that the United States meets its alliance responsibilities and obligations and maintains leadership in the organization. Second, partnerships help USAFE units maintain their operational readiness. Third, partnerships help the United States build interoperability and partner capacity support to out-of-area operations. Fourth, USAFE conducts engagements with the goal of helping ensure stability in the AOR and to encourage cooperation among partner countries. Fifth, USAFE seeks to attain, improve, and maintain access to countries in the AOR. In spite of the potential benefits of USAFE's BP activities, USAFE's posture and its BP activities do come with a cost. In today's austere fiscal environment, it is appropriate to assess how the United States and the U.S. Air Force can build partnerships most efficiently while ensuring that the requirements for maintaining key alliances and partnerships continue to be met. This raises several questions about the cost of USAFE's BP activities.

Study Purpose and Approach

This report explores several questions associated with using forward-based forces to build partner capacity. Are there cost savings realized when building partnerships with forward-based forces? What might be gained or lost from a cost perspective, by moving USAFE forces in the continental United States (CONUS)? What might those cost differentials imply about the relative trade-offs of BP from USAFE rather than CONUS? How can the answers to the first two questions inform a more strategic risk assessment of moving USAFE forces?

The approach to the research involves four tasks. Task 1 characterizes the current policy debate on security cooperation and force posture in Europe through a review of the literature and discussions with key policymakers and legislative officials in Washington. Specifically, the study team set out to gain a better understanding of the extent to which security cooperation enters the policy and resourcing debates regarding Air Force forward-based posture in Europe.

Task 2 develops a framework to describe the current BP approach and environment for USAFE, drawing on key U.S. Department of Defense (DoD) strategies and plans, such as the Guidance for Employment of the Force and combatant command (COCOM) theater campaign plans, as well as specific BP data. The three main sources of data for Air Force BP efforts in Europe are USAFE's Building Partnerships Scorecard data, wing- and squadron-

level interviews and data, and a survey RAND designed and distributed to collect information on the routine BP activities of airmen based in Europe. As a result of the findings from this data-collection and analysis task, the team was able to identify high-payoff BP activities. Task 3 defines several alternative postures for conducting BP activities using a building-block approach to cost out each high-payoff BP activity. Associated costs for each building block consider marginal changes as a result of specific BP activities. Task 4 recommends efficiencies to improve the Air Force's BP activities in Europe.

Table S.1 shows the number of BP events, by wing, recorded between September 2009 and August 2010 and the number of partners engaged. Of those partners, the table lists the ones that accounted for about 50 percent of reported events; these appear in order of most to fewest events.[1] The table gives examples of areas in which the wing focused its BP activities.

Table S.1
U.S. Air Forces in Europe Wing Activities for Building Partnerships, September 2009–August 2010

Wing	Number of BP Events	Number of Partners Engaged	Partners Totaling 50% of Events	Examples of BP Activity Focus
31 FW	26	9	Italy	F-16 operations and maintenance Firefighting Security forces Flying training deployments
48 FW	119	30	UK, Netherlands	Close air support and JTACs Flying exercises DACT Medical
52 FW	56	33	Germany, Belgium, Netherlands, Poland	DACT Flying exercises Munitions Maintenance
86 AW	46	27	Poland, Germany, Bulgaria, Belgium, France, Hungary	Airdrops Maintenance exchanges HAW support
100 ARW	44	22	UK, Germany, Belgium, Netherlands	Air refueling currency Transportation operations SERE training Security forces training Open Skies
435 AGOW	42	28	Poland, Germany, Bulgaria, Italy, Portugal, Romania	Cargo preparation Deployable engagement construction JTAC training

NOTE: FW = fighter wing. JTAC = joint terminal attack controller. DACT = dissimilar air combat training. AW = Airlift Wing. HAW = Heavy Airlift Wing. ARW = Aerial Refueling Wing. SERE = survival, evasion, resistance, and escape. AGOW = Air Ground Operations Wing.

[1] In some cases, multiple partners participated in a single event.

Observations About Building Partnerships in Europe

As Chapter Two discusses, USAFE's BP activities are varied and numerous and help build and sustain access, relationships, and partner capabilities. Yet these activities do not appear to enter the debate over posture in Washington, particularly in Congress. The wings and organizations assigned to the command work with foreign partners on a routine basis to help achieve U.S. national security and theater objectives in the AOR and to maximize training for personnel and units given their home stationing overseas. The study team's observations capture the strengths and weaknesses of the current BP approach.

The team identified eight observations from our analysis of the USAFE BP approach and the specific activities USAFE conducts. First, *forward basing facilitates important relationship- and capacity-building BP activities*. Several activities are done primarily because of forward basing, including nearly daily air refueling, frequent JTAC qualification and training, and some hosted events.

Second, a *significant portion of USAFE's BP activities is opportunity-driven, with BP as an ancillary benefit to U.S. training in and with partner countries*. Units can apply training funds for ancillary BP benefit; it is unlikely that this practice would be as common from CONUS. Moreover, USAFE serves as an informal "BP schoolhouse" for the Air Force.

Third, *BP-related strategy and objectives at the country and event levels are not clear to the personnel and units that execute BP activities*. Although not everyone who helps build partnerships needs to know the commander's intent (though it would certainly help), the development of specific objectives at the event level, and of plans at the country level, should be a high priority, as should definition and prioritization of BP events.

Fourth, *although many U.S. units and personnel derive training benefit from BP activities and presence in Europe, some get less benefit than others.* Most respondents to the RAND survey viewed BP-related activities as beneficial to their own training and readiness. Some events are not seen as productive in terms of maintaining U.S. readiness, and the need to alter tactics and narrow information-sharing does, at times, limit training value to U.S. personnel.

Fifth, *existing USAFE reporting processes capture only part of the BP level of effort in the command*. This is a DoD-wide shortfall, and USAFE has improved reporting in the past several years. Data on BP events are often derived from other reporting processes (e.g., after-action reports [AARs] on training events flowing from the unit to the USAFE operations staff). We supplemented these data through interviews with and surveys of wings and other USAFE organizations. Lack of a definition of *BP event* also hampers reporting and analysis.

Sixth, *there are some missed BP opportunities*. Many of these derive from events that could be better utilized to help build partnerships. These include hosting events and maintainer involvement in BP during off-station training events. In some instances, particularly in the 435 AGOW, respondents believed that they were being underutilized for BP activities.

Seventh, *the presence of forward-based forces facilitates coalition operations*. The development and sustainment of personal and unit relationships enables smoother integration during combat operations. Having forward-based U.S. forces that are geographically closer to partners enables repeat visits. Years of interaction with traditional and newer NATO allies have borne fruit for coalition building and capability.

Eighth, *the need to build relationships, capacity, and access in the EUCOM AOR for coalition operations will continue beyond Iraq and Afghanistan.* Cross-COCOM operations and emerging

operational requirements, such as ballistic missile defense (BMD), will place BP demands on forward-based forces in Europe.

Observations Related to Costs for Building Partnerships in Europe

Given that the Air Force currently has forces positioned in Europe, *USAFE's BP activities are relatively efficient*. Most of USAFE's BP costs go to event flying-hours, which are a sunk cost, because units positioned in USAFE regularly fly training missions. Further, many of USAFE's BP sorties are flown from home station and therefore do not incur additional costs for travel and deployment. In all, USAFE's BP activities add only a marginal cost to USAFE's overall annual operating costs (roughly 1.5 percent). We do not assess the relative value or impact of USAFE's BP activities, but USAFE wings accomplish many thousands of hours of BP activities with partner nations (PNs) for the additional costs that USAFE incurs.

Generating USAFE's current BP activities from CONUS could greatly increase the marginal cost of BP. If USAFE's current BP activities were replicated from CONUS, the marginal cost to provide BP could increase fourfold, from $59 million per year to more than $250 million per year.

If USAFE forces were moved to CONUS, some BP activities would need to be significantly curtailed to be cost neutral with regard to direct BP costs. We found that, even when replicating only about half of USAFE's status quo BP activities, both the marginal BP costs and the total operating costs would be more for CONUS than for USAFE's status quo level of activity.

Finally, although the marginal costs to provide BP in USAFE are very sensitive to whether forces are located in Europe versus in CONUS, these changes still have a small overall budget impact relative to total USAFE operating costs. The fact that these costs and savings are so small relative to the overall operation of USAFE forces ought to turn attention back to the benefits of having USAFE forces provide BP and from being positioned in Europe more generally and to determining what is risked by changing those things.

Cost-Analysis Summary

Aggregate Cost-Analysis Results

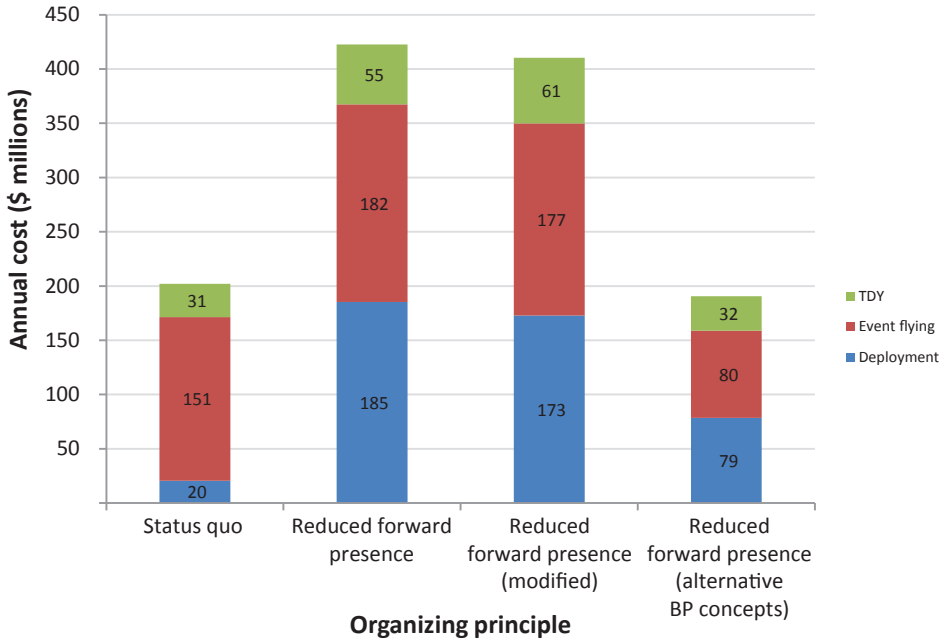
Figure S.1 shows the total costs of each organizing principle, broken out by cost category.

In Figure S.1, our organizing principles are shown on the x-axis. On the y-axis, the height of each column shows the total annual cost (in millions of dollars) to replicate all BP activities appropriate to that organizing principle.

On the left, "status quo" shows the costs we estimated for all USAFE-based BP activities for one year, essentially as they are performed today. Home-station sorties are, in fact, flown from home station; aircraft and team deployments occur for each wing on an annual basis. The costs reflected here make up the total cost to the Air Force but may not all be borne by USAFE directly (e.g., USAFE would typically transport personnel and equipment by means of its own organic airlift, thus not incurring the Air Mobility Command [AMC] costs to transport them).

Here, we can see that the event flying costs, at $151 million per year, dominate the costs. One implication of this is that these BP activities, when conducted from USAFE, are relatively

Figure S.1
Costs of Organizing Principle, by Cost Category



NOTE: TDY = temporary duty.
RAND *TR1241-S.1*

efficient: Three-quarters of the costs go directly to training. Assuming that those flying-hours would normally be included in each wing's training program, the *marginal* cost of USAFE BP activities would be approximately $51 million per year. Again, not all of these will be borne by USAFE. For example, some money is provided by EUCOM for Joint Chiefs of Staff (JCS) exercises and other activities, which would be applied to deployment and TDY costs.

As we move from left to right in the figure, we see that replicating all activities from CONUS incurs an enormous cost penalty, almost doubling the total costs. TDY costs approximately double, and deployment costs increase almost tenfold. The modified CONUS option saves a little because it repackages some of the deployments more efficiently and eliminates air shows and flybys. The rightmost option halves the remaining aircraft-related events, thus bringing the total costs more in line with the status quo. However, less than half of the $186 million goes directly to training, a relatively inefficient use of resources.

Recommendations

We provide the following recommendations for U.S. Air Force consideration.

For the Headquarters (HQ) USAFE level, we offer the following recommendations:

- Ensure that BP and security cooperation are included in the force posture debate where it affects Air Force forces.
  - Broaden the understanding within the Air Force and among decisionmakers in DoD that the marginal cost of BP by USAFE forces is small and that the cost of replicating

USAFE's current BP activities from CONUS could be substantially more expensive, even if BP activities were reduced.
  - Make decisions on posture changes to forces in Europe based on an assessment of whether any savings are worth the risk to access, leadership, and other core U.S. interests.
  - Direct that BP be emphasized in Air Force discussions on force posture in Europe with key congressional staff, the Office of the Secretary of Defense, and Department of State officials.
- Develop a BP strategy for engagement with European partners post–Operation NEW DAWN and Operation ENDURING FREEDOM.
  - Press efforts to develop air-related country plans in the AOR that enable linkages between theater objectives and USAFE BP events.
  - Seek increased engagement with partners in the eastern region of the AOR focused on meeting operational requirements of contingencies in the U.S. Central Command (CENTCOM) AOR. This includes maintaining or expanding access to bases, airspace, and ranges for both combat and support assets and working with potential coalition partners on related operations.
  - Develop options (with EUCOM) for continuing to build partner capacity in niche areas with new members of NATO and less advanced partners in the AOR for future coalition operations. Continue pursuing ongoing efforts to build medical, JTAC, cargo preparation, and other capabilities, as well as institutional capacity.
  - Continue close cooperation in training and exercises with advanced partners in the AOR for future coalition operations. Interoperability and relationship-building at the individual, unit, and command levels are invaluable and affect both the capability and willingness to work with the United States in the AOR and beyond.
- Streamline processes for data collection and analysis.
  - Consider ways to aggregate BP data and express the Air Force's BP successes. Use this report as a first step in making explicit linkages between force posture and BP.
  - Adapt existing reporting regimes across the air staff to capture the BP data required to make informed resourcing and other decisions. USAFE should determine the types of BP activities it absolutely needs to track, and it should focus on those specific types of activities in detail. This may include activities that best support EUCOM's theater campaign plan objectives and activities that help to inform resourcing decisions.
  - Consider administering an annual survey, similar to the one used for this study, to supplement BP data already reported. Adapt the survey to answer questions that support USAFE and EUCOM decisionmaking requirements.
  - Define *BP event*, perhaps in accordance with the study team's proposed definition, and communicate this to the wings. Consider this definition: "A planned or unplanned activity that builds and sustains relationships with, capabilities of, and access to foreign partner militaries in accordance with the combatant commander's theater and country objectives." In addition, BP events should be prioritized on the basis of this definition.
  - Adopt RAND Project AIR FORCE (PAF) methodology for assessing and costing the BP level of effort to support resource and other decisions.

For the HQ USAFE level, in coordination with the wings, we offer the following recommendations:

- Take advantage of additional BP opportunities.
  - Develop concepts to expand and standardize hosting events and to take greater BP advantage of off-station events (especially maintainers).
  - At home station, consider increasing frequency of visits of partner countries to Air Force bases (especially maintainers, logisticians, security forces, and mobility planners). Ensure that the activities scheduled address specific BP objectives for those partner countries.
  - For combat deployments, consider including additional noncommissioned officer (NCO) experts (again, maintainers are ideal) in selected BP activities.

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Abbreviations

AAR	after-action report
AB	air base
ACC	Air Combat Command
AFPAM	Air Force pamphlet
AFRICOM	U.S. Africa Command
AFTOC	Air Force Total Operating Cost
AGOW	Air Ground Operations Wing
AMC	Air Mobility Command
AOR	area of responsibility
ARW	Aerial Refueling Wing
ASOG	air operations support group
AW	Airlift Wing
BMD	ballistic missile defense
BP	building partnership
BPC	building partner capacity
CAF	combat air forces
CAIG	Cost Analysis Improvement Group
CAS	close air support
CASEVAC	casualty evacuation
CENTCOM	U.S. Central Command
CFR	concept funding request
COA	course of action
COCOM	combatant command

CONUS	continental United States
CPFH	cost per flying-hour
CRG	Contingency Response Group
CSAR	combat search and rescue
DACT	dissimilar air combat training
DLR	depot-level reparable
DOC	designed operational capability
DoD	U.S. Department of Defense
DTMO	Defense Travel Management Office
ECM	electronic countermeasure
EUCOM	U.S. European Command
FH	flying-hour
FW	fighter wing
FY	fiscal year
GCI	ground controlled intercept
HAW	Heavy Airlift Wing
HQ	headquarters
JCS	Joint Chiefs of Staff
JTAC	joint terminal attack controller
LIMS-EV	Logistics, Installation and Mission Support–Enterprise View
M2M	military to military
MAJCOM	major command
MDS	mission design series
MEFPAK	Manpower and Equipment Force Packaging System
milair	military airlift
NATO	North Atlantic Treaty Organization
NCO	noncommissioned officer
OJT	on-the-job training
OMLT	operational mentor and liaison team
OOD	Operation ODYSSEY DAWN

OUP	Operation UNIFIED PROTECTOR
PACAF	Pacific Air Forces
PAF	RAND Project AIR FORCE
PAX	personnel
PCS	permanent change of station
PN	partner nation
POL	petroleum, oil, and lubricants
QDR	Quadrennial Defense Review
RAF	Royal Air Force
SERE	survival, evasion, resistance, and escape
TAI	total aircraft inventory
TDY	temporary duty
TLP	Tactical Leadership Programme
TSCMIS	Theater Security Cooperation Management Information System
TTP	tactics, techniques, and procedures
USAFE	U.S. Air Forces in Europe
USAFE/A5I	U.S. Air Forces in Europe Plans and Requirements International
USTRANSCOM	U.S. Transportation Command
WPC	Warrior Preparation Center

CHAPTER ONE

Introduction

According to the 2010 U.S. *National Security Strategy*, "the relationships our Armed Forces have developed with foreign militaries are a critical component of our global engagement and support our collective security" (Obama, 2010, p. 41). The 2010 Quadrennial Defense Review (QDR) notes that "central to the security of the United States is a strong transatlantic partnership, which is underpinned by the bilateral relationships between the United States and the governments of Europe" (U.S. Department of Defense [DoD], 2010, p. 57). The QDR identifies building partner capacity (BPC) as a mission of increasing emphasis in U.S. defense strategy, with the need to expand capabilities for training partner aviation forces receiving special attention. Thus, building partnerships (BP) with European allies and partners, particularly in aviation, is a critical component of the U.S. strategy of engagement and defense.

Like the other U.S. military services, the U.S. Air Force has a long history of working with partner countries in Europe for a variety of purposes, including building capacity, as mentioned already, but also promoting interoperability, building enduring relationships, and ensuring access to personnel and facilities in the region. Forces assigned to the U.S. Air Forces in Europe (USAFE) are in Europe principally to be the air component of U.S. European Command (EUCOM). In addition, they dominate the Air Force's efforts to build and sustain partnerships in the EUCOM area of responsibility (AOR). USAFE forces take part in dedicated BP events, provide "ancillary benefit" to partners through their own operational training in partner countries, and interact with partner personnel, often on a daily basis. These activities range from "community relations" events with the host country to training partner countries to deploy specific capabilities to a coalition operation. These efforts have helped the United States maintain a lead position in Europe and facilitate North Atlantic Treaty Organization (NATO) partner support to operations in Iraq and Afghanistan. At the same time, in the current, more austere fiscal environment, it is appropriate to assess how the United States and the Air Force can build partnerships most efficiently while ensuring that the requirements for maintaining key alliances and partnerships continue to be met.

The Air Force provides BP capabilities from outside the AOR as well, including forces that take part in multinational exercises, train partners on U.S. military equipment, provide education and training through the international military education and training (IMET) program, and engage with partner countries through the Air National Guard (ANG) and the State Partnership Program (SPP).

U.S. Air Forces in Europe Faces Diverse Challenges in Building Partnerships in the Area of Responsibility

The EUCOM AOR comprises 51 countries with security environments, threat perceptions, capabilities, and levels of development that are widely varied. Advanced allies with capable, technologically sophisticated air forces share the AOR with less developed partners with nascent air forces. Some allies engage with the United States in efforts to counter terrorist groups and a recalcitrant Iran. Many eastern European allies are relatively new entrants to NATO and seek to reach alliance standards and deter Russian assertiveness.

The United States' interests in the AOR are also varied and are among its most important and enduring. NATO is, according to the U.S. *National Security Strategy*, "the pre-eminent security alliance in the world today," and U.S. relations with its 27 member countries remain "the cornerstone for U.S. engagement with the world, and a catalyst for international action" (Obama, 2010, p. 41). European allies have capabilities and political will that enable coalition operations and have most consistently joined the United States with combat and support forces in out-of-area contingencies, including Iraq, Afghanistan, and Libya. The expansion of the alliance to countries of the former Warsaw Pact engenders a need to incorporate their forces into alliance structures and standards. In addition, the United States and key NATO allies maintain a tactical nuclear storage and delivery capability that requires both U.S. presence and exercises with allies.

Access to bases and airspace in Europe enables U.S. forces to reach other regions of the globe and provide freedom of action for the United States. Operations in Libya, the Middle East, and central Asia would be nearly impossible without the use of Ramstein Air Base (AB) in Germany and other key sites on the continent. In Europe itself, the United States has a key interest in maintaining regional stability (e.g., in the Balkans) and in helping integrate Russia as a U.S. and NATO partner while assuring friends on Russia's western borders. Finally, the United States seeks to address shared challenges and threats with its European partners, including weapons of mass destruction, terrorism, ballistic missile defense (BMD), and cybersecurity.

EUCOM views BP as its highest theater priority (EUCOM, 2010b, p. 3). According to the *Strategy of Active Security*, BP supports the U.S. strategic objectives of "defending the homeland forward" and "supporting U.S. strategic interests by promoting security and stability" (EUCOM, 2010b, p. 1). As the air component in the AOR, USAFE seeks to operate according to EUCOM's priorities and to support its campaign, operational, and posture plans.

As is discussed in Chapter Two in greater detail, the study team found that USAFE seeks to build partnerships and partner capacity in the AOR for several reasons. First, of course, USAFE supports integration in NATO to help ensure that the United States meets its alliance responsibilities and obligations and maintains leadership in the organization.

Second, partnerships help USAFE units maintain their operational readiness. Access to ranges, airspace, ground controllers, and foreign capabilities and tactics is critical to the ability of USAFE wings—particularly their pilots—to maintain currency and meet Air Force training requirements. Access to eastern European partner countries is especially important given stringent flight and training restrictions in the UK, Germany, and Italy. In Bulgaria, for example, C-130Js from Ramstein are able to execute dirt landings that are required as part of their currency training. Likewise, USAFE fighters can conduct low-level flying and bombing

runs there and can perform dissimilar air combat training (DACT) against MiG-29s.[1] On the other hand, the availability of Spanish ranges and Dutch ground controlled intercept (GCI) controllers and F-16s enhances interoperability with multiple allies and presents many training opportunities to USAFE aircrews. USAFE conducts most of its BP activities in foreign countries as ancillary to U.S. unit training requirements.

Third, relationships that help the United States build interoperability and partner capacity support to out-of-area operations. Thus, for example, European air forces have been able to operate in coalitions with the Air Force in Afghanistan, Iraq, and Libya in part because they have trained and exercised together; standardized tactics, techniques, and procedures (TTP); and developed working relationships. These activities over many years have enabled more-advanced European air forces to plan and fight alongside the United States. Likewise, USAFE seeks to bring less advanced partners into current and future coalition operations by emphasizing important contributions that do not require well-established air force capabilities or institutions. USAFE efforts to develop joint terminal attack controller (JTAC) capabilities for Operation ENDURING FREEDOM have included such allies as Lithuania, Estonia, Slovenia, and Latvia that have no capability to deploy and operate aircraft in overseas contingencies. BP activities have also allowed such countries as Poland to execute cargo preparation operations on their own to enable deployment on U.S. airlifters to out-of-area operations. Even as ongoing operations (such as those in Afghanistan) end, these engagements are meant also to provide a foundation for future interactions, capacity-building efforts, and coalition building when needed.

Fourth, USAFE conducts engagements with the goal of helping ensure stability in the AOR and to encourage cooperation among partner countries. USAFE engagement with the Russian air force (such as senior-leader and counterpart visits or arms control verification discussions) supports relations between that country and the United States, while Air Force presence in Europe and BP activities with new NATO allies in the east are intended in part to assure partners, such as Romania, Bulgaria, and Poland, that are concerned about a resurgence of Russian aggressiveness on the continent. USAFE has also supported such integrative initiatives as Balkan Air Integration and Baltic Air Policing.

Fifth, USAFE seeks to attain, improve, and maintain access to countries in the AOR. Familiarization with partner procedures, facilities, and airspace—and relationships with personnel and leadership—help facilitate U.S. operations both within the AOR and in other theaters. For example, Europe is a key supporting theater for potential operations in the U.S. Central Command (CENTCOM) AOR.

Having significant forward-based forces in Europe—USAFE has more than 31,000 personnel, including more than 6,000 civilians—provides a unique opportunity to conduct BP activities with allies and partner countries on a regular basis ("Major Commands and Reserve Components," 2011, p. 61). The Air Force conducts many of these activities with allies and partners in conjunction with its own training events. In these cases, the specific BP event, such as an exercise, subject-matter expert exchange, or senior-level meeting, occurs at the same time as the Air Force training event. Other BP activities, such as a specific training and capacity-building event or a "familiarization" visit to a Air Force base in Germany or Italy, are developed and executed to enhance the skills and knowledge of the partner country's military.

[1] Basing in the UK, Italy, and Germany certainly enables BP in those countries but also with eastern European partners that bring great training opportunities, increasing the readiness and interoperability of all participants.

Study Objectives and Research Approach

This report considers the nexus between BP and forward-based force posture in the EUCOM AOR. From a quantitative and qualitative perspective, it assesses a sample of BP activities in Europe conducted by forward-based forces that occur as part of being stationed in Europe.

The report provides the results of a study conducted for USAFE leadership based on (1) EUCOM's determination that BP is the highest priority (and the study team does not challenge this), (2) USAFE's internal assessment of what it does in BP, and (3) a cost analysis that assumes a continuation of the status quo, both in terms of posture and in terms of BP activities conducted. The study's scope was, therefore, narrow. It did not include EUCOM's or USAFE's relative importance across the other combatant command (COCOMs) or components or an assessment from current operational theaters about whether these BP activities translate to the operational realm. It also assumed no policy change with regard to BP from the Air Force or DoD.

Study Objectives

This report will assist U.S. Air Force and, particularly, USAFE leadership in assessing and costing alternative means of conducting security cooperation and maintaining relationships with allies and partners in the EUCOM AOR with forward-based forces. The assessment uses actual cost data and evaluates specific proposals for alternative means of and postures for conducting BP activities with partner air forces in the AOR. The report's findings will help the Air Force and DoD qualitatively and quantitatively evaluate these proposals and BP activities within the context of those proposals.

The Air Force asked RAND Project AIR FORCE to address the following five overarching questions:

1. To what extent do BP activities of Air Force forces in Europe enter into the force posture debate? How should BP enter the debate?
2. What does a holistic picture of Air Force BP activities in Europe look like? More specifically, in quantitative and qualitative terms, what is an accurate characterization of the BP activities conducted by Headquarters (HQ) USAFE and the wings assigned to USAFE?
3. How does USAFE incorporate Air Force BP into Air Force training and exercise plans and schedules, as well as into daily interactions with allies and partners?
4. What is the overall value of Air Force BP activities in Europe? How do Air Force BP activities support relationships, building of capabilities, and access in Europe? Which activities does USAFE consider to be high value?
5. Are there more–cost-effective ways to execute the current slate of Air Force high-value BP activities in Europe using other force structure mixes, or other venues in the United States? Which activities can realistically be executed only with forward-based forces?

Research Approach

This study included four discrete research tasks conducted over the course of a year. Task 1 focused on the first research question and attempts to characterize the current policy debate on security cooperation and force posture in Europe. Specifically, the study team set out to understand better the extent to which security cooperation enters the policy and resourcing debates

regarding Air Force forward-based posture in Europe. The team reviewed key U.S. policy and planning documents, such as government policy memoranda and cables, as well as reports by research organizations (see, for example, DoD, 2010; Sustainable Defense Task Force, 2010; and "Co-Chairs Proposal," 2010). We then conducted interviews in DoD, the State Department, and relevant congressional committees, such as the Senate and House Armed Services committees, to capture the key arguments. Informed by the review of the literature and interviews, we then identified the most-prevalent arguments for and against maintaining the current level of U.S. military presence in Europe and noted any perceived benefits of security cooperation activities.

Task 2 focused on the second, third, and fourth research questions and develops a framework to describe the current security cooperation approach and environment for the Air Force in Europe. The team initially focused on reviewing current DoD, COCOM, and Air Force BP guidance, including the Guidance for Employment of the Force (Office of the Secretary of Defense, 2008), the EUCOM Theater Campaign Plan (EUCOM, 2010a) and Theater Posture Plan (EUCOM, undated), and the *2011 U.S. Air Force Global Partnership Strategy* (Secretary of the Air Force for International Affairs, 2011), to understand better the key security cooperation objectives at the theater and country levels. Next, the team focused significant effort on collecting security cooperation data at the EUCOM, HQ U.S. Air Force, HQ USAFE, and wing levels to obtain the most complete picture possible. The three main sources of Air Force BP efforts in Europe are USAFE's Building Partnerships Scorecard (USAFE, 2010) data, wing- and squadron-level interviews and data, and a survey RAND researchers designed and distributed to collect information on the routine BP activities of airmen based in Europe. Through these data-collection and analysis tasks, the team was able to identify high-payoff BP activities. These include, for example, activities related to fighter interoperability, JTACs, and expeditionary airlift.[2] We linked resource requirements, including funding, manpower, facilities, and other force structure, to each high-payoff activity.

Task 3 focused on the fifth research question. Our analytical methodology consists of first defining the level of BP activity that is required by EUCOM and then evaluating the cost of different force postures to conduct that level of activity. Because a clear requirement for BP activities does not exist, we used the level of BP activity currently conducted as the baseline demand for the cost analysis. We began with various databases to identify the level of BP activity currently conducted by USAFE forces. We use a building-block approach to defining this level of BP activities. Each building block represents an activity (e.g., deploy 12 aircraft for a week) that is typically conducted. We also identified the typical frequency of each building block per year. We presented this representation of each wing's BP activities to a representative of each wing and modified it as required. These building blocks can be combined across all wings in USAFE to identify the demand for BP activity. We then cost this set of activities using different force postures (e.g., continental United States [CONUS]–based forces). We also consider variations to this level of activity recognizing that not all activities (e.g., flybys) would be conducted unless the forces were forward-based. That is, some flybys are conducted only

[2] JTAC training involves efforts to select, train, and sustain a cadre of foreign partners capable of providing air-ground coordination (e.g., close air support [CAS], airdrops). Expeditionary airlift involves efforts to improve partner ability to plan and execute cargo, passenger, casualty evacuation (CASEVAC), or airdrop missions on U.S. or partner airlifters. Fighter interoperability involves efforts designed to improve the ability of U.S. and partner fighters and associated support to meet NATO standards and to train and fight together.

because the requirement is for sorties from home station in USAFE AOR, but aircraft would not be deployed for the sole purpose of a particular flyby. We refer to these different force postures and levels of demand as organizing principles in our analysis. The result of this task is a comparison of the cost of using CONUS-based forces to conduct the current level of BP activities and several alternative levels, recognizing that some activities will simply not be conducted unless the forces are forward-based.

Task 4 recommends efficiencies to the Air Force's BP activities in Europe. The team identified the assumptions underlying each building block and the preferred options that provide desired BP capabilities at reasonable cost. The team also recommended ways to optimize the data-collection process to minimize the number of unaccounted-for BP activities.

It is important to note that our research and analysis were limited in the following ways. First, the research provides anecdotal evidence of the utility of BP efforts, but a qualitative or quantitative analysis of the relationship between these efforts and key metrics, such as the amount and quality of U.S. access to European bases, is beyond its scope. Second, the research analyzes only generally the ability of CONUS-based forces to duplicate the level or types of BP activity commonly conducted by forces forward-based in Europe. Many factors would come into play, including rotational limitations, sources of funding, and maintenance requirements. Third, this project did not analyze the total cost of CONUS versus USAFE units to determine whether it was more or less expensive to base units in Europe or the United States. The cost analysis specifically focused on the relative cost of conducting the current level of BP activities using USAFE versus CONUS units. Despite these limitations, the data set for this study is substantial and provides insight into many key BP-related issues.

Organization of This Report

Chapter Two describes the debate over posture in Europe and characterizes how USAFE wings engage partner countries, identifying challenges and opportunities that USAFE faces as it seeks to work with partners while meeting operational readiness requirements. Chapter Two corresponds to Appendix A, which provides the results of our BP survey with USAFE wings and HQ elements. Chapter Three presents our cost analysis of the alternative force postures to conduct BP activities. It includes an overview of our analytical methodology, a representation of the BP activities conducted by each wing that we analyzed in USAFE, several alternative force postures that could conduct these BP activities, the details of the cost analysis and cost data, and the cost of each of the alternative force postures along with the key findings of this analysis. Chapter Three is supplemented by Appendix B, which provides the details of the cost analysis.

Chapter Four synthesizes the results of the analysis and provides the study team's key findings and recommendations for the Air Force and USAFE in particular.

CHAPTER TWO

The Partnership-Building Role of U.S. Air Forces in Europe

Introduction

This chapter characterizes the wide-ranging and ubiquitous BP efforts of the Air Force in Europe and, in particular, details and generally assesses the BP-related activities of forward-based U.S. forces. The first section provides an overview of the current force posture and security cooperation debate in Europe as it relates to the Air Force. Subsequent sections describe how USAFE wings engage partner countries, and the authors use results of BP-related reporting systems, interviews with USAFE wings, and surveys of USAFE personnel to identify challenges and opportunities that USAFE faces as it works with partners while meeting operational readiness requirements.

The Debate About Force Posture, Security Cooperation, and Building Partnerships in Europe

Security cooperation, especially those activities executed by USAFE, appears to play only a minor role in the debate about overseas force posture. We draw this observation from both the literature review and interviews with key U.S. officials. An interesting case study is the loss of 18 F-16s by the 52nd Fighter Wing (FW) at Spangdahlem AB, Germany, in April 2010, as a result of Air Force fighter-reduction and cost-saving initiatives. The wing is instrumental in helping enhance Poland's air force and support the future Air Force detachment there with rotational deployments. Yet, our understanding is that perceived security cooperation benefits and potential effects did not factor into that decision.

We found that one of the most-influential reports on the posture debate came from the Sustainable Defense Task Force, a group of analysts sponsored by Representative Barney Frank (D-Massachusetts). The task force's June 2010 report argues that, in Europe, "the need for a high-readiness deterrent force is a small fraction of what it once was," that USAFE force structure should be reduced by 10,000 personnel and one FW equivalent, and that basing arrangements in eastern Europe should be curtailed (Sustainable Defense Task Force, 2010, p. 17). However, most notably for the purposes of this study, the topic of security cooperation conducted by U.S. forces overseas does not appear anywhere in that report. Indeed, the team's interviews with key congressional staffers confirmed that the Air Force's BP activities in Europe and elsewhere are not well understood or even acknowledged at a rudimentary level. Moreover, compared with the U.S. Army in Europe, the Air Force's role in BP is less understood

and appreciated.[1] Our interviews indicate that the Army has reached congressional audiences, arguing that the funding of its brigade combat teams (BCTs) are not only critical for operations but also extremely important for partnership and capacity-building activities in Europe.[2]

A second major observation from our research is that forward-based Air Force forces regularly engage in BP activities with allies and partner countries during their readiness training. According to officials we interviewed, this type of arrangement offers "bang for the buck," combining Air Force training requirements with partner-country BP opportunities whenever possible. Examples include the following: holding noncommissioned officer (NCO) seminars with partner enlisted ranks during off-station training events; engaging partner air traffic controllers to help facilitate ongoing working relationships for future access; conducting mission planning and debrief sessions during exercises; and demonstrating capabilities of U.S. equipment to generate partner interest in adding to force structure.

Third, BPC for coalition operations is an important function of airmen based in Europe and is likely to extend well beyond Afghanistan. Indeed, we found that USAFE and EUCOM planners are thinking about Air Force BP requirements well beyond the current fight. Operation ODYSSEY DAWN (OOD) and Operation UNIFIED PROTECTOR (OUP) in Libya were strong catalysts for this type of forward thinking regarding BP. Efforts to enhance interoperability with the United States' most reliable partners in NATO facilitated coalition operations in a rapidly developing, unforeseen contingency operation beyond European borders. Even small, less capable partners have shown an ability to develop niche capabilities and contribute to operations in Afghanistan, leaving open opportunities to build their capacity in other areas for future contingencies.

Fourth, some underreported security cooperation activities of forward-based forces in Europe have important relationship-building benefits. Simply being in the same time zone as European allies and partners enables routine contacts that help to build lasting relationships. These daily, routine activities are often opportunity-driven and possible only with forward-based forces. These include aerial refueling, DACT, and air traffic control.[3]

Fifth, there are some practical benefits of having forces stationed in Europe, such as diplomatic arrangements, which can enable timely access. For example, forward-based forces and civil servants enjoy diplomatic status, which essentially means that they are more easily able to travel on short notice to an allied or partner country, bypassing the official and often cumbersome visit-request process. Additionally, U.S. pilots become familiar with operating in European airspace and working with personnel and procedures from multiple nations.

Sixth, related more to the posture debate, several officials remarked that, once a U.S. capability is removed from the European theater, it may be difficult to bring it back. In essence, the "access threshold" has not been tested and is therefore unclear. Useful access to a partner nation's bases, airspace, and armed forces takes years to cultivate but could take much less time to atrophy if not supported by agreements, frequent use, and, potentially, presence. Establish-

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[1] Discussions with senior congressional staff members, December 2010.

[2] We are certainly not suggesting a connection between the Air Force improving its outreach to Congress and the provision of additional BP resources. Nonetheless, increasing the value of Air Force BP activities *might* be used to strengthen an argument to maintain certain components of the existing force posture in Europe.

[3] Although having forces in or near the host nation greatly facilitates BP, there is at least one counterexample in which military-to-military (M2M) relations are quite close without the United States having any forces based in country. That example is Australia.

ing the linkage between presence and access is beyond the scope of this analysis; it suffices to note that it would be imprudent to withdraw forces from and curtail activities with Europe without understanding how it affects U.S. access to this critical region. One does not want to discover by accident the threshold below which U.S. drawdowns endanger access.

We conclude that BP alone does not justify a large, forward-based presence in Europe; however, BP activities, undertaken by airmen as part of being stationed in Europe, are a valuable tool for promoting and enhancing relationships and building partner-country capability and capacity. Determining value is extremely challenging, but cost comparisons help to make the arguments clearer.

All Six Wings of U.S. Air Forces in Europe Engage in Activities to Build Partnerships

The Air Force's presence in Europe is, in some ways, a legacy of the Cold War, but the level of forces and the number of European bases on which Air Force assets reside are a small fraction of what they were when NATO faced the Warsaw Pact across the inter-German border. Remaining Air Force forces seek to maintain their operational readiness and to enhance relationships with, and capabilities of, foreign partners. In fact, with their primary training venues naturally located in Europe, USAFE units *must* work with foreign partners if for no other reason than to gain and sustain training partnerships necessary to maintain their operational readiness.

The study team analyzed six wings and other organizations under USAFE in the AOR;[4] Table 2.2 shows each wing, its base, and the key assets and capabilities associated with it. Manpower at each of the five aircraft-assigned wings includes not only the pilots and maintainers for operating the planes but also the logisticians, civil engineers, security forces, medical personnel, and other agile combat support (ACS) professionals required to sustain and deploy a combat unit. The 435th Air Ground Operations Wing (AGOW) has no assigned aircraft (it is collocated with the 86th Airlift Wing [AW]) but fields a wide array of capabilities for expeditionary "open-the-base" operations, tactical air control and weather teams, theater communications, and other operations. These capabilities are deployed in 19 geographically separated units and 14 sites across the AOR (Ramstein AB, 2011). The wing's manpower includes air traffic controllers, JTACs, civil engineers, medics, and security forces. The 435th Contingency Response Group (CRG) provides an open-the-base capability but is also formally dual-tasked as of 2010 to build partner capacity.

All wings engage in BP activities. In addition, USAFE has other organizations dedicated to BP, including elements of the HQ command and staff at Ramstein and the Warrior Preparation Center (WPC) at Einsiedlerhof, Germany. Elements of the HQ staff—particularly those in USAFE's Directorate of Plans, Programs, and Analyses (AF/A5/8/9)—conduct BP planning, programming, execution, data collection, and assessment of the command's BP efforts. USAFE leaders also expend considerable effort to interact with foreign counterparts. Among the WPC's responsibilities are providing initial qualification training to U.S. and coalition JTAC candidates, supporting the Tactical Leadership Programme (or TLP) in Albacete, Spain, and supporting the Polygone Electronic Warfare (EW) Range in Bann, Germany. All of these

[4] There are a handful of combat support and air-base wings in USAFE that the team did not analyze.

Table 2.1
U.S. Air Forces in Europe Wings

Wing	Base	Assets	Capabilities
31 FW	Aviano AB, Italy	F-16CG A-10	Air defense and strike CAS
48 FW	RAF Lakenheath, UK	F-15C F-15E HH-60G Medical Group	Air defense Strike Search and rescue
52 FW	Spangdahlem AB, Germany	F-16CJ	Suppression of enemy air defenses
86 AW	Ramstein AB, Germany	C-130J C-21 Other	Tactical airlift VIP and aeromedical airlift
100 ARW	RAF Mildenhall, UK	KC-135R	Aerial refueling
435 AGOW	Ramstein AB, Germany	CRG Air Support Operations Group Other assets	Opening contingency bases JTACs BPC

NOTE: RAF = Royal Air Force. ARW = Aerial Refueling Wing.

activities support interoperability among multiple partner countries. In the future, the WPC will also be responsible for training and interoperability related to BMD in the AOR.

U.S. Air Forces in Europe Recorded 545 Events in a Year of Collecting Data on Building Partnerships

USAFE has placed a high priority on collecting and analyzing information on the level of effort expended in the command on BP. This effort is beginning to bear fruit, although, as discussed later in this chapter and in Chapter Three, significant challenges remain in accounting for the myriad of activities in which wings and units engage partner countries. The discussion in this section provides an introductory description, based on data collected by HQ USAFE, of BP activities conducted by the six USAFE wings we analyzed. Chapter Three offers a more detailed analysis of these activities to quantify and cost the wings' efforts.

USAFE after-action reports (AARs) and the BP scorecard reveal that the command conducted 545 "BP events" between September 2009 and August 2010.[5] About 63 percent of these events involved "traditional" NATO allies—those in the alliance during the Cold War, such as the UK, Turkey, Germany, and Spain—and Israel. Some 31 percent involved new NATO allies—Poland, Romania, and Hungary—as well as other eastern European countries, countries in the Caucasus, and Russia. The remainder, or about 6 percent, involved African countries and others outside of EUCOM's AOR.

We summarize the BP data collected by USAFE in Table 2.2. The table shows the number of BP events by wing recorded between September 2009 and August 2010 and the number of partners engaged. Additional events were conducted by other organizations,

[5] The term *BP event* has not been defined, a challenge addressed later in this chapter.

Table 2.2
U.S. Air Forces in Europe Wing Activities for Building Partnerships, September 2009–August 2010

Wing	Number of BP Events	Number of Partners Engaged	Partners Totaling 50% of Events	Examples of BP Activity Focus
31 FW, Aviano AB, Italy	26	9	Italy	F-16 operations and maintenance Firefighting Security forces Flying training deployments
48 FW, RAF Lakenheath, UK	119	30	UK, Netherlands	CAS and JTACs Flying exercises DACT Medical
52 FW, Spangdahlem AB, Germany	56	33	Germany, Belgium, Netherlands, Poland	DACT Flying exercises Munitions Maintenance
86 AW, Ramstein AB, Germany	46	27	Poland, Germany, Bulgaria, Belgium, France, Hungary	Airdrops Maintenance exchanges HAW support
100 ARW, RAF Mildenhall, UK	44	22	UK, Germany, Belgium, Netherlands	Air refueling currency Transportation operations SERE training Security forces training Open Skies treaty
435 AGOW, Ramstein AB, Germany	42	28	Poland, Germany, Bulgaria, Italy, Portugal, Romania	Cargo preparation Deployable engagement construction JTAC training

NOTE: HAW = Heavy Airlift Wing. SERE = survival, evasion, resistance, and escape.

including HQ USAFE and the WPC.[6] Of those partners, the table lists the ones that together participated in about 50 percent of reported events; these appear in order of most to fewest events.[7] Finally, the table gives examples of areas in which the wing focused its BP activities.

The 31 FW had the lowest number of both events and partners during the period analyzed. Italy participated in more than half of the events reported for the wing. The 31st naturally worked closely with its host, Italy, and focused in particular on F-16 operations and maintenance and firefighting and security procedures. Other partners engaged included Spain, Romania, Slovenia, and Bulgaria. Personnel from the 31st conducted flying and weapon training deployments and DACT in Spain, maintenance NCO training familiarization in Bulgaria and Romania, and JTAC training with the Slovenians. The wing also used Slovakian ranges to prepare for an out-of-area deployment.

Reported data indicated that the 48 FW had, by far, the largest number of BP events during the period at 119 and worked with 30 partner countries. The UK dominated the wing's BP activities with 74 events, while the next largest, the Netherlands, participated in 15. Events with the UK involved dissimilar air combat and air-to-ground (including JTAC) training,

[6] Though we discuss the activities of HQ USAFE and the WPC later, the data we attained on them were less detailed than those of the wings. Thus, we do not include them in Table 2.2, nor do we include them in the cost analysis provided in the next chapter.

[7] In some cases, multiple partners participated in a single event.

combat search and rescue (CSAR), and medical or health-related events (including medical evacuation, or MEDEVAC) through the 48th Medical Group and a regional medical center at RAF Lakenheath. The 48 FW conducted several training events with UK and Dutch aircraft, as well as ground controllers. Other partners with multiple events included France, Spain, Sweden, Germany, and Poland. The wing participated in the TLP in Spain; multilateral NATO exercises, such as ALLIED STRIKE in Germany and FRISIAN FLAG in the Netherlands; and engine maintenance operations in Poland. The wing also trained with smaller partners in Baltic and Icelandic air policing events in Lithuania and Iceland, respectively; medical familiarization in Moldova; and CSAR familiarization in Romania.

The 52 FW reportedly conducted 56 BP events with 33 partner countries. Seventeen of these events involved the host country, Germany, while events involving Belgium, the Netherlands, and Poland (which is now flying F-16s) totaled about eight each. Types of events varied considerably and included DACT; NATO and Joint Chiefs of Staff (JCS) exercises, such as ALLIED STRIKE and BRILLIANT ARDENT; maintenance interoperability training; munitions operations; and flight safety. Notably, the wing reported some events with partner countries from outside the AOR, including Canada (hosting senior leaders) and Africa, in coordination with the 17th Air Force (17 AF), in Ghana (working-dog procedure familiarization), Morocco (F-16 maintenance), and a group of other African countries (an M2M event to develop basic aircraft and vehicle maintenance and logistics programs for North Africa and trans-Sahel partners).

Other USAFE units also supported BP events in the U.S. Africa Command (AFRICOM) AOR. One of these units is the 86 AW, which partnered with Mali, Nigeria, South Africa, and other countries on separate occasions. The 86th participated in AFRICOM's MONASTERY exercise in South Africa and FLINTLOCK in the trans-Sahel and conducted maintenance familiarization with Malian and Nigerian counterparts. But the vast majority of 86 AW BP events were in the AOR. Poland, which has five U.S.-supplied C-130Es at Powidz AB, participated in the most with eight, and these included airdrops and maintenance exchanges, as well as initiation of a "sister-wing" relationship with the Polish 3 AW. The 86th also conducted airdrops in Bulgaria and, in Hungary, supported the HAW at Papa AB, a consortium of 12 European countries that operates three C-17 cargo aircraft. Lastly, the wing demonstrated C-130J capabilities in Israel while completing training requirements for aircrew, and it supported interoperability training with the Israelis.

More than one-third of the events reported by the 100 ARW involved the UK and Germany, with another 20 partners rounding out the remaining events. Activities conducted with advanced partners often involved aerial refueling training, whereby U.S. KC-135R pilots and boom operators met currency requirements along with allied fighter pilots. However, the wing also conducted BP events not related to aerial refueling, including transportation operations (Croatia), SERE training concepts (UK), security forces training (UK), and engine maintenance support (UK). Finally, the wing supported missions over Russia in compliance with the Open Skies treaty.

The 435 AGOW executed a wide range of BP events with 28 partner countries during the year of analysis. Poland, Germany, and Bulgaria participated in the most events; these included cargo preparation activities with Bulgaria and Poland and JTAC and deployable engagement construction in Germany. The wing also participated in engagements with Serbia, Georgia, Cyprus, Albania, and Portugal, to name a few. Other BP activities the 435th conducted included airfield site surveys, tactical weather training, and combat communication support.

Note that the staffs at HQ USAFE and the WPC also engaged multiple partners in a wide variety of efforts. HQ USAFE reported more than 120 BP events during the period in about 37 of the 51 countries in the AOR. Bulgaria, Romania, Hungary, Croatia, and Poland were among the highest instances, suggesting a focus on eastern European allies. Many of these events were M2M and technical exchanges and senior-leader interactions. For example, exchanges with Bulgaria often involved standardization and evaluation procedures, surveys, studies, and conferences. Those with Croatia involved familiarization with air sovereignty operations, JTAC training, and water purification equipment. Some events also focused on more-advanced allies in the West, including Germany, France, and the UK; these featured senior-leader visits, conferences on elements of airpower, and participation in regional training events.

WPC reporting during the period between September 2009 and August 2010 was relatively light. These included one report of the JTAC qualification course performed at RAF Lakenheath for 15 Belgian, Finnish, German, and Slovenian students; support for the JCS exercise FLEXIBLE RESPONSE involving Germany and Italy; and support for an operational mentor and liaison team (OMLT) event to help Hungarian, Slovenian, and Polish OMLT members better understand CAS for a mission in Afghanistan. The reporting during this period did not adequately represent the WPC's BP activities, according to RAND interviews with WPC command and staff.[8]

The preceding discussion provides a general overview of a year of USAFE BP activities. The activities highlighted include events involving USAFE aircraft, technical and M2M exchanges, senior-leader visits, and interoperability training. An additional type of activity, community relations, comprised about 20 percent of reported events. Every wing and organization in USAFE engages partners in these "good-neighbor" activities, often in the communities surrounding the home station. Community relations include flybys for commemorations, base tours for community leaders, and meetings with mayors. It should be noted that community activities are not limited to U.S. forces overseas; every base, whether located overseas or in the United States, engages in them to ensure productive, friendly relations with the citizens living nearby and with local and state governments.

Wing Interviews and Surveys Provided a More Comprehensive Picture of Efforts by U.S. Air Forces in Europe to Build Partnerships

The RAND team supplemented data collected by HQ USAFE by visiting the six wings, the WPC, and the HQ itself to engage commanders, staffs, pilots, maintainers, civil engineers, medics, and personnel in other career fields in focused discussions on their experiences in BP. In addition, the team developed and conducted an online survey of the same organizations to systematically attain BP-related information and quantify some of the results.[9] These efforts provided a more comprehensive and nuanced view of USAFE's BP efforts than could be

[8] Little reporting about WPC activities was found in the data during the period analyzed, but this was due to lack of reporting, not activity. The center began rectifying this as of the beginning of 2011 (author discussions with WPC officials, May 2011).

[9] The study team received outstanding support for the wing visits and surveys from leaders and staffs at HQ USAFE and the wings themselves.

derived from the data alone. They revealed challenges and opportunities that USAFE faces as it seeks to meet U.S. and theater objectives in the AOR.

The RAND team held focused discussions during visits to the wings and other organizations between November 2010 and May 2011.[10] These discussions often were held with groups of about five to 15 people and were divided by specialty (e.g., pilots, air traffic controllers) but, at times, included multiple specialties. In addition, the team had separate discussions with wing and organization leadership. The survey was online from April to June and asked respondents for information about frequency and length of participation in BP events, communication with foreign partners, the effect of BP on individual and unit training, and resources (in particular, manpower) required to build partnerships. The survey questionnaire and results can be found in Appendix A.

The discussion in this section provides observations that emerged from the interviews and survey. We categorize the observations as follows:

- *Mission:* the extent to which the BP mission is guided by strategy or opportunity in the AOR
- *Training:* how BP events affect and are affected by the requirement of U.S. units to maintain operational readiness
- *Operational impact:* qualitative insights into the effects of partnerships on contingency operations
- *Resources:* the availability of funding and skilled manpower to implement BP efforts
- *Access:* how efforts to build partnerships might relate to U.S. access to partner countries.

Many of the examples provided in the discussion are in terms of three capabilities that USAFE seeks to build, sustain, and enhance with partners and that were deemed by USAFE and the RAND team to be high value in terms of BP:

- *JTACs:* efforts to select, train, and sustain a cadre of foreign partners capable of providing air-ground coordination (e.g., CAS, airdrops)
- *Expeditionary airlift:* efforts to improve partner ability to plan and execute cargo, passenger, CASEVAC, or airdrop missions on U.S. or partner airlifters
- *Fighter interoperability:* efforts designed to improve the ability of U.S. and partner fighters and associated support to meet NATO standards and to train and fight together.

Mission

A common refrain during wing interviews was that BP in USAFE appears to be opportunity- rather than strategy-driven. USAFE organizations do seek to build partnerships as an "ancillary benefit" of their own training efforts, but only some of the BP element is based on top-down guidance. Wing personnel do not believe that they are seeing the "big picture" of BP in the AOR, and, in particular, the commander's BP intent of individual events often is not clear. HQ USAFE has recently developed a "white cell," whose purpose is to take advantage of BP opportunities when they arise and to provide some guidance to participating units. But numer-

[10] The team visited the 48 FW and 100 ARW in the UK in March 2011; the 31 FW in Italy and the 52 FW, 435 AGOW, 86 AW, and WPC in Germany in May 2011; and HQ USAFE in Germany in November 2010 and May 2011.

ous interlocutors at the wing level maintained that their guidance is to "go out and do good" without actionable, BP-related tasks.

In some respects, this lack of guidance that some wing personnel lamented may be appropriate. First, not every airman on a BP-related deployment needs to know and understand the commander's intent, although such knowledge can serve as motivation for even the most-junior participants. But certainly wing leadership, planners, and mission commanders need to have a sense of what specific objectives the United States seeks to achieve in a given partner country and how the capabilities covered during a particular BP event fit into those objectives. In some cases, this sense of purpose and overarching strategy is present, but often it is lacking. Second, for forward-based forces that operate continuously in partner countries, many BP events may naturally be opportunity-driven. In fact, forward basing allows USAFE to quickly take advantage of emerging opportunities and to derive ancillary BP benefit from normal training activities. F-15Es from the 48 FW can enable short-notice upgrades of UK and other JTACs because of the wing's presence at Lakenheath; likewise, the KC-135Rs from the 100 ARW Mildenhall can provide aerial refueling to partner-country aircraft on virtually a moment's notice. But even opportunity-driven events must be placed in a strategic context.

Detailed, air-related country plans would help provide this context. Such plans would provide HQ USAFE and wing planners with objectives to be achieved and training and capability milestones to be met, and they would allow planners to tailor events to help implement the plans. Initiatives are under way at HQ Air Force (as part of Campaign Support Plan development) and at HQ USAFE to develop and standardize such plans. These would be of enormous value to promoting cost-effective efforts to plan and execute BP events, whether they are opportunity- or strategy-driven.

Better country planning could also help USAFE take advantage of missed opportunities noted during the wing visits. For example, few maintainers involved in discussions with us at the wings stated that they had engaged with partner-country personnel during training events either at home station or on deployment. Nearly half of maintainers and logisticians who responded to the RAND survey said they did not participate in BP-related activities. Many maintainers stated that their activities during off-station training events were limited solely to sortie generation and that they rarely, if ever, "crossed the tarmac" to engage with foreign maintenance personnel. A focus on sortie generation is, of course, warranted, but such events could also be opportunities for structured seminars with host-country maintainers—even those in eastern Europe who work on aircraft that are different from U.S. aircraft—on such areas as aircraft safety and toolbox organization and control. These could support objectives related to both expeditionary airlift and fighter interoperability.

A second example of missed opportunity is during hosted events, those events in which foreign partners visit U.S. bases in Europe to observe operations or learn U.S. training techniques. Some of these events, when they are focused and have clear objectives, can have important BP effects on partners. For instance, visits by the Poles on separate occasions to observe U.S. operations at Spangdahlem (fighter operations and hydrazine fuel servicing), Ramstein (apparently every three months, including to observe preparations for aeromedical missions), and Aviano (F-16 maintenance operations) were heralded by many discussants as having important effects on the growing U.S.-Polish partnership and on Polish operational capability of its F-16s and C-130Es. On the other hand, several hosting events discussed during wing visits were much less fruitful, because either the wing or the personnel hosting the visit were unclear about objectives and appropriate schedule; these reportedly turned into "shopping trips" for

the visitors, who took advantage of their travel to Germany, the UK, or Italy. Hosting events, if planned carefully, can have great impact in terms of BP and partner capacity.

Finally, some units reported that they felt underutilized for BP. In particular, organizations in the 435 AGOW, including the CRG, believed that they had the capacity to do more. Although the CRG has only recently been "dual-hatted" to build partnerships in addition to opening bases, it has been conducting dedicated BP activities for many years. One example of this is the CRG's work with the Poles in the past ten years to enable expeditionary airlift for coalition operations in Iraq and Afghanistan. Beginning with basic concepts of cargo planning, the Poles are now capable of doing their own planning, preparation, handling, and loading for airlift by U.S. aircraft. Moreover, they are applying U.S.-based concepts to their C-130E operations, reportedly improving their own ability to perform expeditionary airlift.

To get the most benefit out of a more strategically oriented approach to the mission of BP, it is important that decisionmakers have the fullest possible visibility into the activities being pursued throughout the command. Such visibility is critical for assessments, planning, prioritization, resourcing decisions, and advocacy. BP is an area of relatively recent focus across DoD. Reporting (or management information) systems do not yet adequately capture DoD's BP activities in a way that supports such decisionmaking. USAFE has worked hard to improve the accounting of its BP efforts, particularly for advocacy purposes, but its reporting processes also are not optimized for BP. USAFE's processes for reporting BP activities—like those of other DoD organizations—is plagued by inconsistent application, terminology, and data. BP-related data often are gleaned from AARs that units send to respective staffs in the HQ (i.e., flying units to HQ USAFE Operations, or AF/A3, support units to Logistics and Installations, or AF/A4/7). Specific information on cost, number of aircraft and personnel, and tasks accomplished are often incomplete or missing. Moreover, not all BP events are reported, whereas other events that have little or no BP value are reported and counted as equivalent to high-value events.

Lack of a basic definition of *BP event* promotes some of these inconsistencies. Without a definition, it is difficult to provide guidance on what data should and should not be collected to those in the units or staffs with responsibility for BP reporting. With this in mind, we offer the following definition of *BP event* for consideration: A planned or unplanned activity that initiates, builds, and sustains relationships with, capabilities of, and access to foreign partner militaries, leaders, governments, and populations in accordance with the combatant commander's theater and country objectives. This is a relatively broad definition, but there are important concepts within it. First, the fact that an activity can be unplanned ensures the inclusion of "pop-up" opportunities. Second, BP activities should work toward sustaining a relationship, inasmuch as "one-off" visits—those in which there is little or no follow-up for months or years—may actually harm a relationship by raising a potential partner's expectations of future collaboration with the United States. Third, the audience is not only the partner's military but also the leaders, other nonmilitary parts of the partner's government, and its citizens. Lastly—and perhaps most importantly—the event must help achieve the COCOM's theater, regional, and country objectives. As mentioned previously, more-systematic country planning, particularly from the Air Force and air component perspective, would facilitate clear linkages between event goals and tasks on the one hand and country and theater objectives on the other.

The definition also contains the seeds of a means of valuing and prioritizing BP events. For example, how important to COCOM priorities is U.S. participation in a particular air show? What is the comparative value of a chance meeting and discussion on the tarmac about aircraft safety between a U.S. maintainer and a Bulgarian counterpart, and a seminar for Bul-

garian 7-level equivalents taught by a U.S. senior master sergeant? Or of off-station training that involves teaching the Greeks about U.S. processes for generating fighter sorties and a visit to Aviano by Greek maintainers to observe the end-to-end process in action?

The following list provides suggested criteria for valuing and prioritizing BP events:

- *Benefit for U.S. training*. It is particularly important, and often of highest priority, that an event help participating U.S. personnel and units meet their training and readiness requirements.
- *Level and rank of U.S. and partner personnel*. Depending on the type of event, more experience on both sides would help ensure that the appropriate skills are properly taught and learned.
- *Partner's ability to absorb the skill or capability imparted*. An event must match a capability being emphasized with the partner's capacity to understand it and incorporate it into training and operations.
- *Durability of skill or capability imparted*. BP concepts that "train the trainer" facilitate absorption and sustainment of a skill or concept into a partner's military. The focus of this criterion is the sustainability of a skill or capability.
- *Relevance to interoperability*. This would help evaluate the extent to which an event enables the Air Force and its partners to share procedures, tactics, concepts of operation, and other important components of a successful coalition operation.
- *Relevance to operational capability*. This refers to whether an event helps improve a partner's ability to conduct military operations in accordance with the COCOM's and air component's objectives and as established in the country plan.
- *Relevance to ongoing or future contingency operations*. Related to interoperability and operational capability, this would determine the applicability of an event to meeting operational objectives in particular scenarios (e.g., Libya, Afghanistan).
- *Relevance to institutional capacity*. A partner's capacity for training, logistics, planning, programming and budgeting, personnel management, and other important functions of military institutions provides the foundation for a sustainable and operable national military organization and one that is able to learn and improve.
- *Relevance to military professionalization*. Events focused on professionalizing a foreign military are intended to encourage adherence to democratic human rights and legal norms and to civilian authority.
- *Relevance to access*. Access to foreign leaders, bases, airspace, and intelligence is critical to enabling U.S. global reach.
- *Relevance to good neighborliness and U.S. image*. This measures the utility of an event to promoting positive attitudes toward the United States and U.S. presence and to facilitating cooperation between U.S. forces and local communities.
- *Potential for sustained U.S. partnership and interest in U.S. concepts and equipment*. This final criterion evaluates whether an event entices a partner to pursue further BP interactions with the United States and potentially to buy U.S. services or equipment.

These criteria could be prioritized differently for each partner country engaged based on COCOM and air component objectives and the focus of U.S. policy in the region. Moreover, it should be noted that these criteria could apply not only to single events but also to long-term exchanges (e.g., when a U.S. officer is assigned for a year to a partner's planning staff).

It is important to emphasize that any enhancements in BP reporting should avoid increasing the workload on wing and unit personnel. In other words, they should not add to the existing reporting burden on units. A holistic approach to improving BP reporting would be pursued in the context of streamlining existing management information processes across other key functions, including after-action reporting.

Training

The first criterion listed in the previous section refers to benefits of BP activities to U.S. training. This is of key importance to both USAFE and the wings and squadrons assigned to it. Much of the training for attaining qualifications, maintaining currency, and conducting upgrades in USAFE-assigned units—and, for some units, all training—is carried out in partner countries. Although USAFE units do conduct some training in CONUS (e.g., at Red Flag), it would be very expensive and time-consuming to do the majority of training events across the Atlantic. As such, USAFE *must* forge and sustain relationships with countries in the AOR to gain access to their ranges and airspace and to train with them. Longstanding relationships with traditional allies, such as the UK, the Netherlands, and Germany, provide opportunities for U.S. personnel to train with other capable air forces, while emerging relationships with newer allies, such as Poland, Romania, Bulgaria, and Hungary, open opportunities for U.S. training in less restrictive ranges and airspace than are available elsewhere in the AOR. One respondent to the RAND survey remarked that "working BPC significantly opens up more training areas, ranges, and events—all of which are of great benefit to the squadron, [Air Force], and more importantly [in the] long term, NATO." And, as indicated previously, through required U.S. training, USAFE and its wings seek opportunities for ancillary BP benefit.

In the RAND survey, about half of the respondents reported that they take the opportunity to build partnerships and "impart ancillary BP benefit" during all or most off-station training events; about one-third said that they very rarely or never see this benefit. Interestingly, two-thirds of respondents from operations groups (e.g., pilots) answered "all" or "most," while about the same proportion of logistics personnel (largely maintainers) answered "some" or "very rarely/never," reinforcing the point made in the previous section about missed opportunities. The survey also revealed that, for the most part, USAFE personnel get benefit from training in foreign countries and with foreign personnel. A plurality of 44 percent responded that conducting training off-station in foreign countries is very beneficial for their learning, currency requirements, and unit training, while one-third said that it is somewhat beneficial.

But, at times, HQ USAFE and wing commanders must make trade-offs between meeting training requirements and BP, and, although many USAFE personnel get training benefit from BP events, they also face training challenges. Each specialty has training requirements to maintain current qualifications or to upgrade—for example, fighter pilots must meet Ready Aircrew Program (RAP) requirements of flying-hours per month of certain types and quality. Units (e.g., squadrons) have readiness requirements they must meet for levels of supplies, working equipment, and trained personnel to generate sorties and execute missions defined in their designed operational capability (DOC) statements. Maintaining needed levels of currency and readiness is a challenge even for squadrons in CONUS; in Europe, where BP is also a high priority, the effort to maintain unit readiness can be even more challenging. Wing personnel in USAFE often talk of the paucity of "white space" on the training calendar—periods of time when units can do nontraining activities. Some BP events provide little or no training value and thus are seen not only as occupying this white space (if any) but also as eating into train-

ing time. Other events provide high training value, which is of greater value to U.S. personnel. However, many of these events help build relationships among U.S. and partner-nation (PN) individuals and units, so the overall value may transcend the training value.

The training value of BP events can vary depending on the type of U.S. unit and aircraft or other equipment, the goal of a training event, the level of sophistication of the partners, the availability of ranges and other training environments, and other factors. For example, the ability of U.S. strike or CAS aircraft (including F-15Es, A-10s, and F-16s) to work with both U.S. and foreign JTACs at ranges in Croatia enables those U.S. pilots both to maintain currency in controlled bombing missions and to encounter different levels of capability among controllers; at the same time, these events ensure qualification and currency of the foreign JTACs themselves. In fact, it appears that, of the three key capabilities used as high-value examples in this section (JTACs, expeditionary airlift, and fighter interoperability), the ability of USAFE units to work with JTACs provides the most training utility. The C-130Js out of Ramstein perform airdrops with eastern European paratroopers that help airlift pilots maintain currency in these operations, and, during some of the events, they can take training advantage of access to dirt landing strips and to airspace that allows them to conduct tactical approaches that they cannot execute in Germany. Likewise, U.S. fighters in Europe are able to do DACT with foreign pilots flying Typhoons, MiG-29s, and Tornados. This training provides U.S. pilots with adaptive skills and allows them to experience missions against pilots with different tactics, capabilities, and procedures, and it helps prepare U.S. pilots for both combat against adversaries and combat integration with allies.

On the other hand, some training involving partners appears less beneficial to U.S. currency and readiness requirements. PN air forces have less advanced capabilities than those of the Air Force—with some trying to maintain just a basic capacity to field an air force—and U.S. tactics must, at times, be adjusted to account for this in ways that detract from U.S. training. Events related to fighter interoperability appear to be the most problematic. For instance, it is a challenge to find adequate air-to-air training for U.S. pilots apart from UK Typhoons and Tornados, particularly those flying F-15Cs at Lakenheath. There are multiple reasons for this, including lack of ranges, the need to "dial back" skills and tactics during exercises to match partner capabilities and meet nondisclosure requirements, and restrictions in the AOR on important training regimens, such as launches of AIM-120 air-to-air missiles. On this last point, there is even uncertainty about mission capability of the AIM-120s because pilots are rarely able to use them in live-fire training events (and live-fire training using AIM-120s is expensive). USAFE will also likely experience interoperability and training challenges with the introduction of the F-35 into the command.[11]

Other squadrons and wings in USAFE also face training challenges of varying difficulty. One survey respondent notes that "any time participating in exercises where we must limit our tactics or training due to host-country or self-imposed limitations is detrimental to combat readiness and learning objectives of upgrades." Another laments that "almost every training item I need to accomplish is harder to reach, more expensive, takes longer, and has a longer wait time than when done stateside." About 20 percent of respondents claim that currency training (for an individual or a unit) is, at times, postponed, canceled, or waived because of BP needs; 21 percent of these suggest that this occurs, on average, as much as once every three

[11] Interoperability will be a challenge even within the Air Force when the F-35 comes on line.

months. Pilots and others from the operations groups appear to face the most training challenges, with 35 percent of them stating that they experience some postponement or cancellation of currency training due to BP needs.

All in all, training in Europe has both benefits and drawbacks. Given that Air Force units are forward-based in Europe, they seek training opportunities in partner countries and with partner personnel that maximize their ability to meet training requirements and preserve unit readiness. As they plan for and execute their training regimens, they seek opportunities for BP and BPC where practicable. As such, BP is often an ancillary benefit of U.S. training and thus can be considered a "free commodity" derived from that training and the resources applied to it.

It is interesting to note that, given the emphasis in DoD on BP and on improving the military's ability to work in different cultures, languages, and environments, assignment to USAFE can provide immense benefit to the BP training of U.S. airmen. About 76 percent of survey respondents stated that they had not worked with foreign partners in BP events before coming to USAFE. Yet, 74 percent say that they now work with partners in USAFE. In practical terms, then, USAFE serves as a real-world BP "schoolhouse" for the Air Force because many airmen in USAFE frequently work with foreign partners and must understand their procedures and environment to ensure the success of day-to-day operations.

Operational Impact

Many USAFE BP efforts facilitate planning, combat, and support operations with current and potential coalition partners. Operation IRAQI FREEDOM and Operation ENDURING FREEDOM have provided the impetus for these efforts in the past ten years, as allies and partners have sought to contribute to operations in Iraq and Afghanistan. But activities to enhance the capacity of partners and improve interoperability among NATO allies in Europe predate 2001 and extend back to the post–World War II and Cold War eras. These decades of BP activities have helped traditional NATO allies forge relatively modern and capable air forces that can operate together in complex combat environments. And, since the fall of the Soviet Union, new allies have emerged that are taking similar paths toward having more-capable air forces.

JTAC capabilities represent an area of USAFE BP focus that enables both developed and less developed partners to contribute to out-of-area contingencies, particularly in Iraq and Afghanistan. JTACs have been indispensible during these operations for calling in CASEVAC, airdrop, and strike missions. The vast majority of JTACs in Afghanistan are from the United States or UK. However, other countries, including Italy, Belgium, Poland, and Estonia, have contributed JTACs to operations there.[12] This capability not only is critical to the success of efforts in Afghanistan but also provides a means for smaller countries, such as Estonia, that want to contribute to develop a new capacity and provide forces to a high-priority contingency. Moreover, JTAC capabilities can be seen as an important opening for countries that had not been able to conduct coalition operations in the past to enhance future contributions even beyond JTAC capabilities.

USAFE is helping expand the pool of JTACs in Europe for out-of-area operations in two ways. First, the WPC offers six courses per year that provide initial JTAC qualifications to both U.S. and coalition students. These courses produced 87 graduates in fiscal year (FY) 2010 from

[12] Author correspondence with officials at the WPC, May 2011.

Latvia, Poland, Lithuania, the Czech Republic, Slovenia, Hungary, and several other partner countries. Each course involves academic study and field training with eight simulated and actual control events, including with actual aircraft and live munitions. After going through the course, graduates return to their units to conduct mission qualification training with four additional controls. This is the second area in which USAFE supports JTAC training: providing aircraft and U.S. JTACs to complete partner JTAC qualifications and to maintain their currency over time. This includes participation in the annual, multinational air-ground exercise, ALLIED STRIKE. In this way, multiple countries, including new NATO allies, can provide important contributions to ongoing coalition operations outside the AOR.[13] For some smaller partners, JTACs have become a niche capability and source of national pride and can provide an opening for development of other capabilities as warranted.[14]

USAFE efforts over many years to enhance fighter interoperability in the alliance helped make possible NATO operations over Libya. Interoperability applies at both the tactical and operational levels and includes mission planning; incorporation of intelligence, surveillance, and reconnaissance; air tasking; and mission execution. RAND discussions at the wings indicated that combined training, as well as routine interactions among operators at exercises and other types of events, contributed immensely to smooth integration during coalition operations. Multinational exercises, such as ANATOLIAN EAGLE, ALLIED STRIKE, and FRISIAN FLAG, as well as courses at the ten-country TLP in Spain, which provides mission commander training to non-U.S. fighter pilots, help raise coalition standards and synchronize tactics and procedures well before any contingency operation occurs.

Pointing out that "wars are come-as-you-are," many interlocutors—including some USAFE leadership—emphasized that the relationships built with foreign planners and pilots during exercises were indispensible in coalition operations, particularly rapidly developing ones, such as OOD and OUP over Libya. One survey respondent stated that "the more we can train with our NATO partners the better the cooperation will be when the time comes to execute." Many indicated that the relationships forged during steady-state activities made it easier to integrate and fight together during contingency operations because U.S. and partner personnel had worked together before. As one discussant put it, "it's sort of along the same lines as [U.S.] units training together—making friends, contacts, and building cohesiveness," which, as another pointed out, has "been vital in Operation ENDURING FREEDOM and OOD/OUP to be able to work alongside them." In practical terms, one interlocutor emphasized that "communications barriers occur in combat. It is better to find that specific verbiage is confusing in a training scenario rather than finding out in combat."[15]

The RAND survey indicates, in fact, that many USAFE airmen forge relationships and have ongoing, informal communication with partner personnel. This includes not only relationships with partner military personnel but also local political leaders, as well as contractors in partner countries who provide services and supplies to visiting U.S. forces during engage-

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[13] One official described Polish JTACs as "very impressive," and, after several years of USAFE-Polish JTAC courses and engagements, the Poles have developed their own JTAC training pipeline.

[14] Other niche capabilities mentioned include field medical care, search and rescue, setting up an airfield (with perimeter security and communications), heavy construction, and cargo movement.

[15] The project team did not have the opportunity to speak with U.S. or NATO commanders involved in the Libya operation, nor was the team privy to AARs that could provide more empirical insight into the effects of previous BP activities on operational outcomes.

ments. About one-third of respondents estimated that they engaged in informal communication with partner personnel at least once a month, while another 22 percent communicated once every three to six months. Half of these communications were face-to-face, with another 44 percent by email or telephone. A small but growing percentage of these communications was by texting, chatting, and Skype. And, in several interviews, discussants mentioned Facebook as a means of communication with partners. These informal communications involved maintaining personal relationships (32 percent), preparing for upcoming events (30 percent), discussing and resolving technical issues (27 percent), and evaluating past events (11 percent).

In sum, interviews in USAFE suggest that BP events in which USAFE units participate on a continuing basis serve to raise partner ability to contribute to contingency operations, enhance interoperability, and provide "intangibles" that facilitate integration when the alliance must execute combat missions. This is not to say that coalition operations run as smoothly or easily as U.S.-only operations. But BP activities in USAFE appear to facilitate operations with the United States' most reliable NATO allies and coalition partners, increase the number of partners able to contribute to operations, and—because of improved core and niche capabilities across a wide array of partners in the AOR—potentially expand the number of partners *willing* to contribute to operations.[16]

Resources

Although central accounts (e.g., EUCOM) fund a significant number of BP events, many resources come from USAFE unit training and result from the expenditure of U.S. training funds that are part of budgets that the U.S. Air Force allocates to major commands (MAJCOMs), such as USAFE. As such, it is a free commodity to EUCOM and other sponsors of activities with foreign partners offered by USAFE airmen as a matter of course. To be clear, we note that USAFE training funds are not used to train partners but rather to train U.S. units in partner countries where foreign military personnel receive ancillary benefit from interaction with USAFE airmen and assets. For a partner to attain maximum benefit, the partner government must apply its own resources to its participation in an event; the lack of availability of partner resources sometimes limits the extent to which a partner can participate in these events with U.S. forces. The point is that even routine USAFE unit training results in benefits to partners, and unit training funds make this possible, almost by default. This constitutes a benefit of being present in the region, a benefit that CONUS-based forces are unable to duplicate.

As indicated previously, BP is EUCOM's top priority per its *Strategy for Active Security* (SAS). USAFE, as it seeks to maintain the readiness of the forces assigned to it, must translate that priority into action. Yet, despite the high priority accorded to BP, this mission does not appear in unit DOC statements. DOC statements lay out the missions that units are to be able to perform, and they drive training, resources, and evaluation of both the unit and its commander. Thus, if a unit performs a mission that does not appear in its DOC statement, the unit does not formally train to execute the mission, the resources the unit receives for operations do not take the mission into account, and the unit's ability to perform the mission is not assessed. At the individual level, personnel are not given skills required to do the mission well,

[16] Decisions to participate in coalition operations, of course, derive from many, often more-important, factors beyond possession of capability. Moreover, participation can serve political rather than operational purposes. The study team was unable to analytically determine political willingness or operational effectiveness from BP activities.

they perform the mission in addition to those included in the DOC statement, and they are neither evaluated nor rewarded for doing it well (e.g., it does not benefit career progression).[17]

Most USAFE personnel understand that BP is a high priority in the AOR and view BP as one of their primary missions. Seventy percent of survey respondents state that BP is an important part of their readiness training missions. But they point out that "manning does not appear to take into account this critical mission." One respondent remarked that

> there is a difference between what our unit DOC statement specifies and what we understand the overarching mission and goals of 3rd AF, USAFE, [and] EUCOM are. The bottom line is that EUCOM desires BP participation [and] that is part of our mission no matter what we are actually tasked with in the DOC statement. However, we are not necessarily funded, trained, [or] equipped to execute BP in addition to or in combination with DOC requirements.

Because of this, whether BP events are funded by outside sources or as beneficiaries of unit training and funds, any additional manpower needed to conduct the BP component of an event can be taken "out of hide"—i.e., it is an additional, unfunded requirement.

Supervisors and commanders of flights, squadrons, wings, and staffs who completed the RAND survey believe that their manning should be, on average, about 3 percent higher than what they currently have to account for the additional demands of BP activities. Many units are assigned fewer personnel than they are authorized, so, in some cases, filling authorizations could help alleviate the BP manning challenge. In other cases, assigning personnel to 100 percent of authorizations would not suffice, so manpower requirements might need to be reassessed if BP-related activities are to be taken into account. However, it is a rare case when a commander anywhere in the Air Force believes that his or her unit is "adequately manned;" BP is just one of several activities that could create this perception.

This resourcing challenge for USAFE and its wings does not necessarily indicate that DOC statements should be changed to reflect the additional demands of BP among forward-based forces. The importance of BP relative to other demands on units must be established before the Air Force institutes changes in training, resourcing, and career progression based on this mission.

Access

USAFE conducts numerous BP activities designed to gain, maintain, and expand access to partner countries in both the EUCOM and AFRICOM AORs. Building relationships with foreign personnel is one form of access, whereby USAFE can help promote U.S. national interests and, in some cases, enable access to partner military and civilian leadership. BP-related interactions help pave the way for peacetime access to bases, ranges, and airspace as well. This access is critical to providing training opportunities for USAFE and other Air Force units. It can also facilitate U.S. military operations in or from the AOR.[18] A case in point is access to Aviano AB, where years of USAFE efforts to build trust and joint procedures between U.S. and

[17] In a future posture that has BP as a priority, the logic would shift from "Do what you can within available resources without disrupting training" to "Make BP priority the unit mission, rather than a secondary mission done more or less with spare capacity."

[18] For more information on how basing access is negotiated and how it plays politically within partner countries, as well as between host and guest, see Cooley, 2008.

Italian air traffic controllers provided the only means to enable high-intensity air operations from that critical base during OOD and OUP.[19] Even in Africa, site surveys and assessments of airfields and partner assets can lead a partner to request additional interaction and assistance.

Note that peacetime BP activities do not guarantee wartime access; the relationship between U.S. interactions with foreign partners and presence in partner countries on one hand and the amount of access granted at critical times on the other is not clear. Turkey provides a notable example of a close, established partner refusing to support U.S. operations in a time of need, as it did in the lead-up to Operation IRAQI FREEDOM in 2003. However, when interests of the United States and its partners coincide, the familiarization, procedures, agreements, and relationships forged over time are crucial to facilitating rapid response to crises either by U.S. forces alone or in coalition with allies and friends.

Although previous BP activities and relationships may not be a major determinant of willingness to cooperate in specific situations, laying the groundwork for cooperation and support of contingency operations is important in terms of allowing access once a decision is taken. Cross-COCOM access requirements may drive some BP activities in the EUCOM AOR even after cessation of operations in Afghanistan. Concurrent analysis in RAND Project AIR FORCE (PAF) on future CENTCOM operational requirements suggests that access to bases and airspace in eastern portions of the EUCOM AOR, for example, could be crucial in the event of a large-scale U.S. conflict with Iran.[20] Iran's growing ballistic missile and rocket arsenal threatens U.S. air operations at bases across the Persian Gulf in Gulf Cooperation Council (GCC) countries. Moreover, the United States may not be able to count on political cooperation from all of its key partners or access to important bases and airspace. Thus, the PAF analysis suggests that Air Force planners must consider dispersal options that are both farther away (to improve survivability against short-range ballistic missile attack on air bases) and provide options for enlisting more partners as a hedge against denial of access by some. A BP focus on access to partners in the eastern parts of the AOR is therefore warranted.

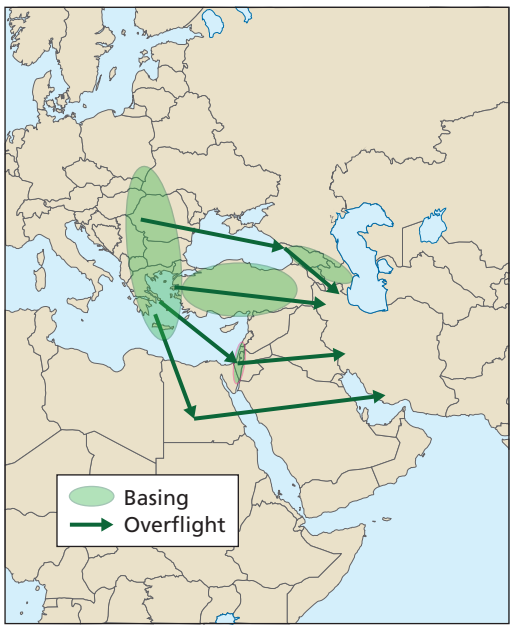
Figure 2.1 depicts locations in the EUCOM AOR where U.S. strike aircraft could be based in a crisis or conflict with Iran. The figure also shows air corridors from these bases to targets in Iran (note that some corridors pass through the airspace of countries outside the AOR). Bases are considered appropriate if they can support U.S. F-16s either currently or with some development, are within refueling range of key targets in Iran (enabling 1.5 to more than two sorties per day), and are not vulnerable to debilitating missile attacks. The bases are also rated higher if aircraft overfly fewer countries on their way to and from Iran. Bases in the AOR located in Azerbaijan, Bulgaria, Israel, Greece, Hungary, Poland, Romania, and Turkey are considered most appropriate and useful in a large conflict with Iran. From these bases, there are four air corridors to Iran: over the Black Sea and through the Caucasus (overfly two countries); through Turkey (one country); through Israel, Jordan, and Iraq or Saudi Arabia (one to three countries); and through Egypt and Saudi Arabia (two countries).

It may be worthwhile for USAFE to conduct activities that promote access to bases and airspace in these countries for CENTCOM contingencies. Most of the EUCOM partner countries noted above have multiple bases that are appropriate to consider. In these coun-

[19] The Italians have very strict qualifications for air traffic controllers, and only those U.S. controllers who had mastered these qualifications (taking approximately six months) are allowed to operate at Aviano.

[20] Many thanks to RAND colleagues David Frelinger and Jacob Heim for sharing their analysis of Air Force posture requirements to support U.S. strikes against Iran. Results of that study had not been published as of April 2012.

Figure 2.1
Access to Bases and Airspace in U.S. Conflict with Iran



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tries, examples of these activities include those that promote improvements to bases that are already appropriate and expanded understandings and agreements over their use. In Poland and Hungary, only one or two bases are identified as appropriate. To ensure that the United States retains multiple options, USAFE might consider site surveys of candidate airfields in southeastern Poland and eastern Hungary to expand the number potentially available to U.S. forces. At the same time, BP planners in USAFE may be wise to expand and exercise overflight rights in the Caucasus, Turkey, and Israel. Finally, BP events in countries of the eastern part of the AOR could include deployments of combat and support aircraft to familiarize U.S. forces with operations in these areas, to habituate the partners to U.S. presence and capability, and for deterrent options when necessary.

Aside from Iran scenarios, other operational requirements are emerging that call for important BP activities with countries in the EUCOM AOR in part to gain and maintain access and to enhance the ability of U.S. partners to operate as a coalition. Among these are the need to defend against ballistic missile attack and to respond rapidly to contingencies in North Africa and the Middle East. Some perennial requirements for access will remain, particularly for global reach through Europe, control and exercise of tactical nuclear assets remaining in the AOR, and assurance of U.S. partners in eastern Europe and the Caucasus vis-à-vis Russia.

Summary Observations About Building Partnerships in Europe

In sum, USAFE's BP activities are both varied and numerous and help build and sustain access, relationships, and partner capabilities. Yet, these activities do not appear to enter the debate over posture, particularly in Congress. The wings and organizations assigned to the

command work with foreign partners on a routine basis both to help achieve U.S. national security and theater objectives in the AOR and to maximize training for personnel and units given their home stationing overseas.

Drawing from our review of the data and interviews, we identify eight key observations from our analysis of the USAFE BP approach and the specific activities USAFE conducts. First, *forward basing facilitates important relationship- and capacity-building BP activities*. Some activities are done primarily because of forward basing, including nearly daily air refueling, frequent JTAC qualification and training, and some hosted events.

Second, *a significant portion of USAFE's BP activities is opportunity-driven, with BP as an ancillary benefit to U.S. training in and with partner countries*. Units can apply training funds for ancillary BP benefit; it is unlikely that this practice would be as common from CONUS. Moreover, USAFE serves as an informal BP schoolhouse for the Air Force.

Third, although those executing BP at the wing level are familiar with broad national security objectives, *linkages to strategy and objectives at the country and event level are not as clear.* Not everyone who helps build partnerships needs to know the commander's intent (though it would certainly help); however, the development of specific objectives at the event level and of plans at the country level should be a high priority, as should definition and prioritization of *BP events*.

Fourth, *although many U.S. units and personnel derive training benefit from BP activities and presence in Europe, some get less benefit than others.* Most respondents to the RAND survey viewed BP-related activities as beneficial to their own training and readiness. Some events are not seen as productive in terms of maintaining U.S. readiness, and the need to alter tactics and narrow information-sharing does at times limit training value to U.S. personnel.

Fifth, *existing USAFE reporting processes capture only part of the BP level of effort in the command*. This is a DoD-wide shortfall, and USAFE has improved reporting in the past several years. Data on BP events is often derived from other reporting processes (e.g., AARs on training events flowing from the unit to the USAFE operations staff). We supplemented these data through interviews with and surveys of wings and other USAFE organizations. Lack of a definition of *BP event* also hampers reporting and analysis.

Sixth, *there are some missed BP opportunities*. Many of these derive from events that could be better utilized to help build partnerships. These include hosting events and maintainer involvement in BP during off-station training events. In some instances, particularly in the 435 AGOW, there was a belief that they were being underutilized for BP activities.

Seventh, anecdotally, we found evidence that suggests that *the presence of forward-based forces facilitates coalition operations*.[21] The development and sustainment of personal and unit relationships enable smoother integration during combat operations. They also allow high revisit rates to partners that require it to increase their capacity for operations out of area. Years of interaction with traditional, as well as newer, NATO allies have borne fruit for coalition building and capability.

Eighth, and also based on anecdotal evidence, *the need to build relationships, capacity, and access in the EUCOM AOR for coalition operations will continue beyond Iraq and Afghanistan.* Cross-COCOM operations and emerging operational requirements, such as BMD, will place BP demands on forward-based forces in Europe.

[21] However, to make this point definitive, we note that data from ongoing operations in Afghanistan, Iraq, or perhaps Libya would be needed.

Based on the characterization in this chapter of USAFE's BP environment, the next chapter analyzes the activities of USAFE wings in detail. It estimates the costs to the Air Force of conducting BP in Europe and compares these with the costs of doing the same events from CONUS.

CHAPTER THREE

Cost Analysis of Alternative Force Postures

Introduction

This chapter presents our cost analysis of alternative force postures to conduct BP activities. We divide the chapter into five sections. The first presents an overview of our analytical methodology. The second offers a representation of the BP activities conducted by each wing that we analyzed in USAFE. We use this representation as the demand for BP activities in the analysis. In the third section, we identify several alternative force postures that could conduct these BP activities. The fourth discusses the details of the cost analysis and cost data. The last section presents the cost of each of the alternative force postures along with the key findings of this analysis.

Analytical Approach

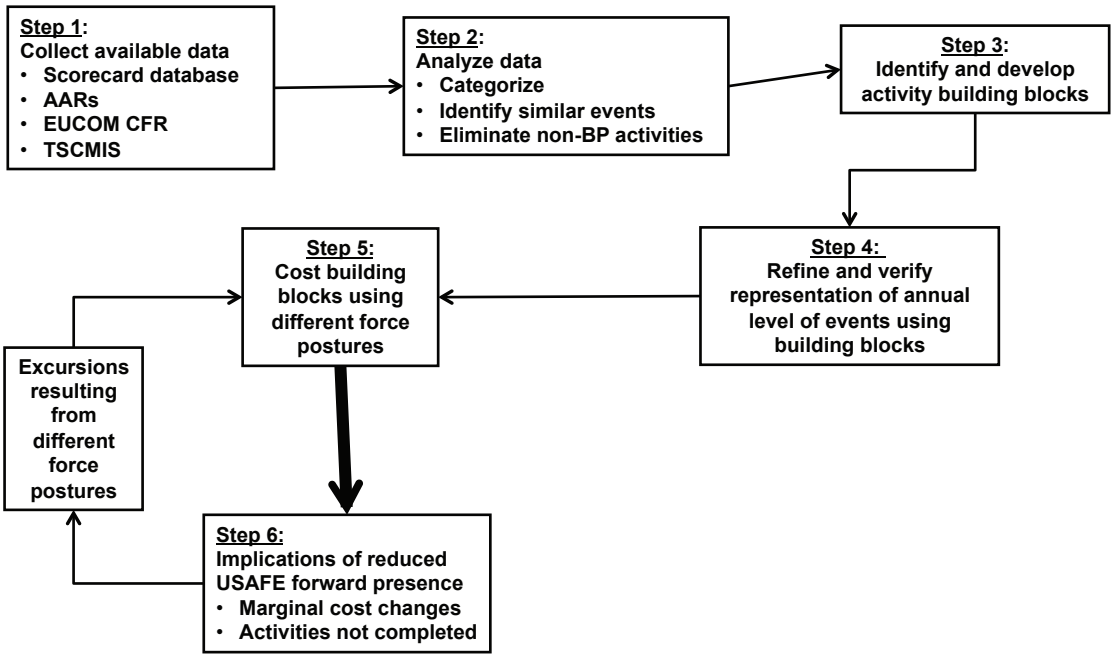
In this analysis, we consider different force postures to conduct the BP activities currently being done by USAFE units. Our approach holds constant the overall Air Force force structure and varies the location of those forces to assess the cost impact. We use as a baseline demand USAFE's current BP activities and then consider alternative force postures to meet that demand. We consider CONUS-based forces to be the primary force posture alternative for conducting BP in USAFE. We also consider excursions on this force posture by reducing or eliminating some of the activities that will likely be lost if forward-based forces are not available. We cost these alternative force postures and draw conclusions based on this analysis.

At the outset of this analysis, we anticipated having a documented level of BP activities that could be used as the demand in this analysis. However, as Chapter Two indicates, this does not exist. Various documents identify and describe BP activities, but these documents do not provide sufficient detail to cost alternative force postures. As a result, the BP demand level analyzed here is our best representation of the BP activities currently conducted by USAFE forces. In effect, the analysis considers and costs alternative force postures for the same force structure to conduct the same level of BP activities currently conducted by USAFE.

The approach consists of several steps. Figure 3.1 presents the analytical approach in a flow chart. In this section, we step through each of these blocks on the flow chart and describe the approach.

The first step in this analysis was to collect data on BP activities conducted by USAFE forces. This analysis requires a detailed description of the level and character of BP activities that are currently conducted. It is not surprising that there is not a single, complete, consistent

Figure 3.1
Analytical Approach Flow Chart



NOTE: CFR = concept funding request. TSCMIS = Theater Security Cooperation Management Information System.

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source of data that we could use to identify the demand. Multiple databases contain required data and provide insight into the activities; we use these databases to piece together a representation of the BP activities currently being conducted by USAFE forces. These databases include (1) the scorecard database, (2) AARs, (3) the EUCOM CFR, and (4) the TSCMIS. Each of these provided a different part of the story. As is typically the case when collecting data on a complex activity, such as BP, the databases are not entirely consistent or complete.

The baseline database for this analysis was the scorecard database, which was provided by USAFE Operations and Analysis (USAFE/A9). HQ USAFE personnel compile these data from multiple sources, the primary of which is wing-level entries. This database provided a significant amount of detail on the activities conducted and was the basis for our understanding of the types and levels of activities being conducted. We combined the data found in this database with information contained in the other databases to develop our picture of BP activities. We then used other databases to augment and refine our understanding of the actual nature of the activities. In some cases, we could match an AAR and TSCMIS entry with a particular entry in the scorecard entry. These other databases allowed us to better understand the size and scope of various activities. For example, we might have an entry in the scorecard data that discusses a deployment of aircraft for a BP activity. The AAR and TSCMIS entry might then provide an understanding of the number of aircraft, duration of event, number of personnel, and other important aspects of the activity.

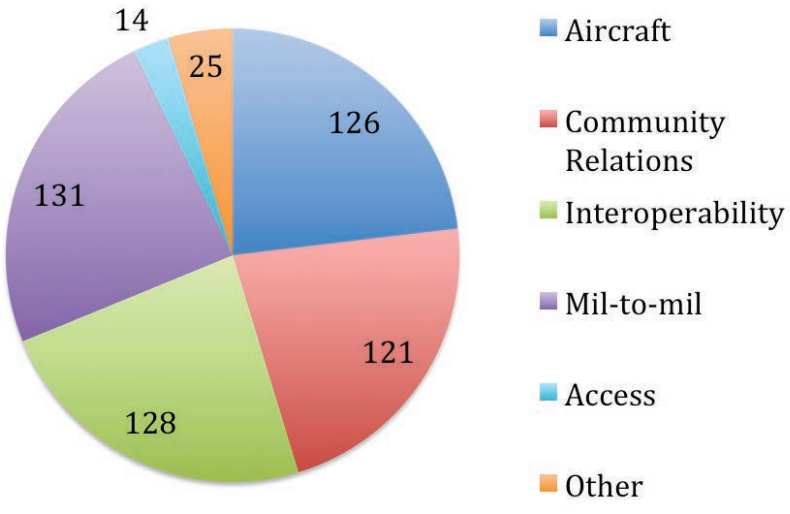
The second step in the process was to analyze the data collected. We began by categorizing the BP events. We identified two ways to characterize the data. The first is by the objective of the activity and then link to categorize the objectives. Examples of categories

are enhancing community relations, improving basing or overflight access to countries, and enhancing interoperability with partner countries. Figure 3.2 shows the breakout by category for all events in our database. In this figure, aircraft events are activities that require aircraft and are either flying sorties or events that are best done with an aircraft (e.g., airlift loading exercise). These events can either be from a unit's home station or require deployment to another base. The community relations activities include meeting with the local mayor and similar activities. Interoperability events focus on enhancing interoperability with PNs. M2M events are meetings and other events involving personnel from the United States and PNs. Access events include events that are designed to enhance base or airspace access with PNs. Other events include military construction and humanitarian relief. This breakout of activities provides insight into the activities.

The second categorization of the data focuses on the force element required to conduct the BP activities. Examples of this include deployment of a squadron of aircraft, flying sorties from home station, and sending a few temporary-duty (TDY) personnel to work with a partner country.

Categorizing the events by objective is important to understand the focus of the activity. We used this categorization to understand what BP activities were conducted and to eliminate, for the purposes of the analysis, what we defined as non-BP activities. For the purposes of the analysis in this chapter, we applied a rigid definition of a BP activity as needing to directly enhance the warfighting potential of the United States or a partner country or both. We identified community relations activities as non-BP. These activities include relationships with local officials and the community at large. Personnel at all U.S. bases—both in CONUS and overseas—generally conduct community relations activities. Although these interactions are important, they are made because the base exists and would not be conducted in a different force posture that did not include that particular base. That is, elimination of the base would mean that the need to have good relations with the local community and keep local officials

Figure 3.2
U.S. Air Forces in Europe Partnership-Building Events, by Type



NOTE: We found 545 total events.

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informed would go away. Because the purpose of this analysis is to evaluate the cost and capability of different force postures to provide BP, we excluded community relations as part of the quantified demand.

Categorizing the events by force element provides a quantifiable level of demand that can be duplicated with other force postures to conduct the BP. This provides the level of demand used in this analysis. As discussed already, these force elements define the elements necessary to conduct the BP activity. We called these force elements *building blocks* in this analysis (step 3 in Figure 3.1). We represent each wing's annual BP activities by a set of these building blocks.

Our methodological construct is to identify these building blocks of BP demand, determine the number of each of these building blocks conducted by each wing and then USAFE forces as a whole, and then cost out this level of activity using alternative force postures. The building blocks provide a mechanism for understanding the types and number of activities conducted. This construct provides a manageable approach to cost different BP activities and permits evaluation of alternative force postures and various excursions. For each wing, we describe the building blocks in sufficient detail to conduct the cost analysis (see Appendix B). We also identify the number of times per year each activity represented by a building block was conducted. This set of building blocks and the frequency per year is specific to a particular wing and represents that wing's level of annual BP activity. But it also represents a level of BP activity that could be conducted by a different wing with the same mission design series (MDS), allowing us to evaluate different force postures. The underlying assumption is that any wing can conduct the BP activity with equal effectiveness (as long as it has the same type of capability MDS). That is, an activity that requires deployment of six F-16s for a week in a partner country can be conducted equally well by any F-16 unit. This approach provides the means to conduct an equally effective, varying cost analysis. Later in this chapter, we present a detailed discussion of the specific building blocks.

The study team developed a representation of the BP demand using the building-block methodology, then discussed it with a representative from each wing, shown in step 4 in Figure 3.1. These conversations validated the approach that our building blocks largely represented the activities the wings were performing. As a result of these conversations, we made changes to the building blocks and the number of events per year. Later in this document, we present the BP demand level for each wing using the building-block methodology.

The next step was to cost each building block for the different force postures (step 5 in Figure 3.1). We used accepted cost approaches and data for the cost analysis. We break down each BP activity by its component parts, including flying-hours, aircraft deployment costs, and personnel costs. We then sum these appropriate cost elements to obtain the cost for each building block in each of the different force postures analyzed. Using this and the number of times each building-block activity was conducted for each wing, we could then determine the total cost of a wing's annual BP activities under different force postures.

Step 6 in Figure 3.1 shows that the results of the cost analysis were considered in two ways. The first was the marginal cost difference between the force postures; the second was a recognition that some activities may simply be eliminated, if the forces are not forward based. For example, certain flybys are likely to be conducted only if forces are close by and would likely be eliminated if conducting it would require an aircraft deployment. We analyzed this by running excursions. Some excursions are an exception to the equal-effectiveness analysis, but we thought they were important to investigate because all activities are unlikely to continue unchanged (e.g., flybys of certain events), with a reduction in forward basing.

Building Blocks

This section describes the building blocks and annual frequency of those building blocks for each wing that was used to represent the demand for BP activities in this analysis. We present the set of building blocks for each of the USAFE wings individually in this section. We discussed each set of building blocks and annual frequency with a representative from each wing to ensure that we provided a suitable representation of the level of BP activities that are typically conducted. We modified the building blocks and frequency as required in order to get a reasonable representation of the type and level of BP activities conducted during a year.

We divided the building blocks into five broad classes: aircraft deployments, personnel (not including aircraft) deployments (i.e., TDY), sorties flown from home station, senior-leader events, and base hosting events. Each class can have multiple building blocks representing different sizes of activities and durations. First, aircraft deployments involve deployment of aircraft, personnel, and maintenance packages to a partner country to enhance interoperability and access. Second, we characterize personnel deployments as events that do not involve the deployment of aircraft. These events typically involve personnel either flying on commercial airlift or using ground transportation with perhaps a small amount of equipment. If the activity is large enough, a C-130 may be used to transport the personnel and equipment. Examples of this would be maintenance or security forces personnel going to a partner country to conduct a BP activity.

The third major class is sorties flown from home station. These activities, as their name implies, do not require a deployment of aircraft. These include fighter sorties to work with partner aircraft or ground personnel (e.g., JTACS or GCI), tanker sorties to enhance interoperability with partner countries by conducting aerial refueling hook-ups, or airlift sorties to participate in partner airdrop training. These activities would require deployment of aircraft if forward-based forces were not present.

The fourth set of activities involves senior-leader visits. We characterize this as a single operational support airlift (OSA) sortie to transport personnel to a partner country for high-level meetings. The final class is hosting activities. Similar to the sorties from home station, these events take advantage of the proximity of forward-based forces to the partner countries by accounting for activities in which personnel from partner countries go to a U.S. base to observe operations. This takes advantage of the forward-based facilities to enhance interoperability and the capability of the partner. An example of this is personnel coming to Ramstein AB to observe a large airlift operation.

We tailored the building blocks to represent the BP activities conducted by each wing. Compiling the building blocks and frequency for all the units provides a representation of the annual BP activities conducted by USAFE. Next, we present the set of building blocks used to represent the activities from each wing.

48th Fighter Wing

Table 3.1 shows the building-block representation for a year of BP activities for the 48 FW.[1] For each building block, we have a wing-specific description of the activities. To a very large degree, all wings held the same types of events, and we could therefore use the same types of building

[1] Details of 48 FW BP activities were confirmed by 48 FW personnel during multiple phone and email contacts in July and August 2011.

Table 3.1
48th Fighter Wing Annual Activities for Building Partnerships, Represented by Building Blocks

Building Block	Details	Frequency
Large-aircraft deployment	12 aircraft, 200 PAX, 15 days, 100 sorties	5
Small-aircraft deployment	6 aircraft, 100 PAX, 15 days, 50 sorties	10
Air-show deployment	2 aircraft, 8 PAX, 5 days	6
Large-team deployment	40 PAX, 10 days	5
Small-team deployment	6 PAX, 10 days	14
Home-station sorties	8 sorties per day for 5 days	12
Flybys	4 sorties per event	4
M2M, large	10 PAX, 4 days	6
Senior leader	1 C-21 sortie	1
Hosting	Teams visiting U.S. base	4

NOTE: PAX = personnel.

blocks to represent the activities. Although there is a lot of similarity in the descriptions across the wings, each description represents the specific wing. In the case of the 48 FW, a large aircraft deployment event is described as 12 aircraft for 15 days. Other wings may deploy more or fewer aircraft for a different length of time.

Based at RAF Lakenheath in the UK, the 48 FW operates both F-15Cs and F-15Es. The 48 FW BP activities can be roughly characterized by about 20 aircraft deployment events per year of different sizes and durations, about 20 personnel deployments (TDY) deployments of different sizes, an M2M meeting every couple of months, hosting a delegation about once per quarter, one senior-leader visit per year, and about 1,700 sorties flown from home station.

31st Fighter Wing

Table 3.2 presents the building blocks representing the yearly BP activities for the 31 FW.[2] The 31 FW is based at Aviano AB in Italy and operates F-16s. BP activities consist of about one large aircraft deployment every couple of months. In addition, the 31 FW deploys aircraft to about one air show per year. There are about ten personnel deployments per year—half small and half large. There are about 15 training exercises per year at the ranges in Slovakia and Croatia. All of these sorties are flown from home station. Each lasts about four days and consists of about eight sorties per day—two two-ships during the day and two two-ships at night. Personnel are deployed to the training range to support these operations. For about 12 of the 15, a small team consisting of 15 personnel is required at the range. About three of the 15 training exercises are JTAC events and require larger personnel deployments. These are included in the large-team deployments discussed earlier. The 31 FW also participates in about five M2M meetings per year, has about two senior-leader events, and hosts a team to Aviano about once every couple of months.

[2] Details of 31 FW BP activities were confirmed by 31 FW personnel during multiple phone and email contacts in July and August 2011.

Table 3.2
31st Fighter Wing Annual Activities for Building Partnerships, Represented by Building Blocks

Building Block	Details	Frequency
Large-aircraft deployment	16 aircraft, 250 PAX, 15 days, 200 sorties	6
Air-show deployment	2 aircraft, 10 PAX, 5 days	1
Large-team deployment	40 PAX, 10 days	5
Training-range personnel deployment	15 PAX, 10 days	12
Small-team short deployment	4 PAX, 5 days	5
Home-station sorties	Ranges in Slovakia and Croatia, 8 sorties per day, 4 days	15
M2M, large	10 PAX, 4 days	5
Senior leader	1 C-21 sortie	2
Hosting	Teams visiting U.S. base	6

52nd Fighter Wing

Table 3.3 shows the representation of annual BP activity for the 52 FW.[3] The 52 FW is located at Spangdahlem AB, Germany, and operates both F-16CJs and A-10s. The 52 FW has about ten deployments per year for supporting BP activities. These are roughly split 50/50 between the F-16s and the A-10s. For each MDS, there are about two large-aircraft deployments and

Table 3.3
52nd Fighter Wing Annual Activities for Building Partnerships, Represented by Building Blocks

Building Block	Details	Frequency
Large-aircraft deployment	A-10: 10 aircraft, 250 PAX, 30 days	2
Large-aircraft deployment	F-16: 16 aircraft, 250 PAX, 30 days	2
Small-aircraft deployment	4 aircraft, 40 PAX, 30 days (3 annual per MDS)	6
Air-show deployment	2 aircraft, 10 PAX, 5 days	5
Large-team deployment	40 PAX, 10 days	1
Small-team deployment	4 PAX, 5 days	9
Home-station sorties	2 to 4 aircraft	10
Flybys	4-aircraft flyover	6
M2M, large	10 PAX, 4 days	5
Senior leader	1 C-21 sortie	4
Hosting	Teams visiting U.S. base	8

[3] Details of 52 FW BP activities were confirmed by 52 FW personnel during multiple phone and email contacts in July and August 2011.

three small-aircraft deployments. In addition, this wing participates in about five air-show aircraft deployments per year. The 52 FW also has about ten personnel deployments in a typical year. The vast majority of these are small teams consisting of a few people going TDY for a week. A typical year of BP also includes sorties from home station. In all, there are about 16 events per year for both interoperability sorties and flybys. There are about five M2M events and four senior-leader events per year. Finally, it is judged that about eight teams from partner countries visit Spangdahlem per year.

100th Air Refueling Wing

Table 3.4 summarizes the 100 ARW's annual BP activities.

The 100 ARW, located at RAF Mildenhall in the UK, operates KC-135Rs. Most of the 100th's BP activities involve the use of its aircraft, and most of these are sorties flown from home station. Partner countries request sorties from the 100th to practice air refueling, and the 100th matches its own pilots' currency requirements with PN requests. These missions, therefore, meet Air Force and PN training needs simultaneously. The 100th flies more than 200 such sorties a year (out of about 1,500 total sorties), tanking more than 1,600 PN receivers. This annual activity level represents about 17 to 18 sorties per month, so we created a monthly building block to represent them.[4]

Occasionally, the 100th will send an aircraft to a PN for a few days to accomplish the same purpose. These involve one KC-135 and four personnel (the crew) for four days. There are about nine such training deployments per year. There are also about a dozen air-show deployments per year, with the same operating footprint as the small-aircraft deployments.[5]

The personnel deployments were few and relatively small. These involved about four personnel for five days at a time, and there were four per year. There was one M2M event per year, with ten personnel for four days. There were three hosting events per year.

86th Airlift Wing

The 86 AW, located at Ramstein AB, operates C-130s, C-21s, and other passenger aircraft. Table 3.5 summarizes that wing's annual BP activities.

Table 3.4
100th Air Refueling Wing Annual Activities for Building Partnerships, Represented by Building Blocks

Building Block	Details	Frequency
Sorties	18 KC-135 sorties	12
Small aircraft	1 aircraft, 4 PAX, 4 days	9
Air-show deployment	1 aircraft, 4 PAX, 4 days	12
Small-team deployment	4 PAX, 5 days	4
M2M, large	10 PAX, 4 days	1
Hosting	Teams visiting U.S. base	3

[4] Sortie data were derived from 100 ARW annual sortie records in a spreadsheet provided by 100 ARW personnel via email in August 2011.

[5] Details of 100 ARW BP activities were confirmed by 100 ARW personnel by phone interview on August 29, 2011.

Table 3.5
86th Airlift Wing Annual Activities for Building Partnerships, Represented by Building Blocks

Building Block	Details	Frequency
Large aircraft	2 C-130s, 150 PAX, 1 week	12
Small aircraft	2 C-130s, 100 PAX, 1 week	12
Off-station trainer	1 C-21, 3 PAX, 4 days	18
Air-show deployment	1 aircraft, 4 PAX, 3 days	15
Small-team deployment	10 PAX, 4 days	7

Like those of the 100th, most of the 86 AW's BP activities involve aircraft. The large- and small-aircraft deployments involve either one or two C-130s, with 100 or 150 personnel, for about a week. A handful of these simply involve the 86th's pilots flying with PN aircraft, but most involve airdrop practice for PN ground forces. The 86th's pilots fly to the PN, accomplishing their own training and currency in the process. While there, they take PN ground forces up and give them the opportunity to practice their own airdropping. They often give many hundreds of PN ground forces this practice with each deployment. These deployments occur in a wide range of countries, including Poland, Bulgaria, Italy, and Macedonia.[6]

The 86th's C-21s constantly deploy to and from PN airfields, providing helpful practice for the USAFE C-21 pilots and the local AB crew. They accomplish about 18 of these per year. Air-show deployments, of which there are about 15 per year, include one aircraft, usually C-130s, with four personnel (the crew) for three days. Finally, there are about seven small-team deployments per year, each with four personnel for four days.

435th Air Ground Operations Wing

Table 3.6 summarizes the 435 AGOW's annual BP activities. To capture the granularity of the 435th's BP activities, we divide them into three groups: the CRG, the 4th Air Operations Support Group (ASOG), and the 7th Weather Squadron. The CRG's activities comprise the lion's share. Two main types of activities dominate their personnel deployments. The first are access-related. Personnel from the CRG visit ports, survey airfields, mark runways, and sometimes install mobile airfield arresting systems. These activities aim to enable USAFE's access to PN airfields.

The second kind of dominant personnel deployment is cargo preparation. Many PNs deploying to operations in Iraq or Afghanistan have little experience deploying on U.S. cargo aircraft. They need to load their equipment and have it pass inspection. The CRG gets tasked to help with this process. A few CRG personnel deploy to the PN where aircraft (usually Air Force C-17s) will be picking them up. The CRG personnel either load the equipment themselves or show the PN personnel how to properly load and secure the equipment so it passes inspection. The ground unit is then prepared to deploy onward.

There are a few more team deployments per year that do not fall into the above categories, including support to exercises and familiarization of PN air forces with Air Force TTP. Viewed

[6] Details of 86 AW BP activities were confirmed by 86 AW personnel via phone interview in July 2011.

Table 3.6
435th Air Ground Operations Wing Annual Activities for Building Partnerships, Represented by Building Blocks

	435 CRG		4 ASOG		7th Weather Squadron	
Building Block	**Details**	**Frequency**	**Details**	**Frequency**	**Details**	**Frequency**
Large-team deployment	10 PAX, 7 days	3	30 PAX, 14 days	2	10 PAX, 14 days	2
Small-team long deployment	3 PAX, 30 days	6	5 PAX, 21 days	3		
Small-team short deployment	3 PAX, 5 days	28	5 PAX, 10 days	6	5 PAX, 5 days	4
M2M	10 PAX, 4 days	4				
Hosting	Teams visiting U.S. base	1				
Construction project	30 PAX, 30 days	20				

through our lens of building blocks, these team deployments amount to three large deployments; six small, long deployments; and 28 small, short deployments.

The CRG also conducts four M2M activities per year and one hosting event per year. Finally, the CRG accomplishes many construction projects. It does about 20 per year, each involving 30 personnel for about a month.

The 4 ASOG's BP activities mostly comprise JTAC training. The ASOG has its own JTACs who regularly train with Air Force aircraft to maintain currency and advance their skills. The ASOG tries to involve PN air personnel as much as possible for mutual benefit. The team deployments listed in Table 3.6 reflect this. Each year, there are a dozen or so of these deployments. Two are larger, longer deployments, with about 30 personnel deployed for two weeks. The rest are smaller, with five personnel each. Three are longer, lasting about three weeks, and six are shorter, lasting about ten days each.[7]

The 7th Weather Squadron conducts a few BP activities each year. The squadron conducts two bilateral exercises each year, shown in Table 3.6 as large deployments with ten personnel for two weeks. It also conducts several traveling contact teams (TCTs), with five personnel for five days. We capture this as four per year.[8]

Alternative Force Postures and Organizing Principles for Analysis

In this analysis, we evaluated different force postures to provide the BP activities. Primarily, we looked at a status quo in which forces were forward-based in Europe and a reduced-forward-presence option in which forces are deployed from CONUS to conduct activities. Because it is unlikely that all activities (e.g., some flybys) will take place if aircraft cannot conduct these mis-

[7] Details of 4 ASOG activities were derived from a document provided by 4 ASOG personnel on July 15, 2011.

[8] Details of 7th Weather Squadron activities were confirmed via telephone interview on July 15, 2011.

sions from home station, we then looked at two modifications to the reduced-forward-presence option in which activities are eliminated or reduced. The first of these modifications eliminates flybys and air-show deployments. This modification also assumes that small-aircraft deployments will no longer be conducted from CONUS. If there is an unexpected maintenance issue on an aircraft that has been deployed a few hundred miles from home station, maintenance items, personnel, or a replacement aircraft can be flown from home station quickly. However, this is not the case for aircraft deployed several thousand miles from home station in CONUS. For cases in which the aircraft are deployed from CONUS, we assumed that activities will either be combined and flown with larger deployment packages or eliminated. For the second case, we considered whether activities would be reduced or eliminated. Throughout this analysis, we refer to these four cases as *organizing principles*. Table 3.7 presents the four cases considered and their effects on the various building blocks.

Cost Analysis

The purpose of our cost analysis was to capture the total cost of BP activities supported by USAFE and then to calculate the cost of alternative means of providing those activities. In this section, we describe our method for calculating costs, including our data sources. We then

Table 3.7
Analytical Organizing Principles

Building Block	Status Quo	Reduced Forward Presence	Reduced Forward Presence, Modified	Reduced Forward Presence, Alternative BP Concepts
Large-aircraft deployment	Forward-based	CONUS	CONUS	CONUS: reduce
Small-aircraft deployment	Forward-based	CONUS	CONUS: eliminate	CONUS: reduce or eliminate
Air-show deployment	Forward-based	CONUS	Eliminate	Eliminate
Large-team deployment	Forward-based	CONUS	CONUS	CONUS
Small-team deployment	Forward-based	CONUS	CONUS	CONUS
Training-range personnel deployment	Forward-based	Deployments from CONUS	Deployments from CONUS	Deployments from CONUS: reduce
Home-station sorties	Forward-based	Deployments from CONUS	Deployments from CONUS	Deployments from CONUS: reduce
Flybys	Forward-based	Deployments from CONUS	Eliminate	Eliminate
M2M, large	Forward-based	CONUS	CONUS	CONUS
Senior leader	Forward-based	CONUS	CONUS	CONUS
Hosting	Forward-based	CONUS	CONUS	CONUS

show the results of our quantitative analysis for the status quo of USAFE BP activities and compare them with results of our alternative organizing principles.

At the time this report was being finalized, the Air Force announced plans to cut the A-10 squadron from Spangdahlem AB. Although our building-block analysis described in the previous section includes Spangdahlem's A-10 BP activities, we chose to assess the costs of providing BP given the anticipated drawdown of those aircraft. Therefore, the cost analysis that follows excludes the costs associated with the A-10 squadron from the 52 FW. This does not change any of our conclusions, only the relative costs of each of the alternatives we explore.

Cost Methodology and Data Sources

We analyzed the costs of USAFE activities with a detailed, data-driven methodology. We broke down each BP activity by its component parts and calculated the costs of each element. We then summed these to show a total cost for each building block. We sought to capture the total costs the Air Force would incur to support each cost element and building block. In practice, some costs would not be billed directly to USAFE. For example, USAFE might use its organic airlift to move a unit, whereas a CONUS unit would incur charges from AMC to move people or equipment. Also, some USAFE BP activities are paid for by EUCOM out of its own budget. When we calculated costs, we included all of these, irrespective of the ultimate billpayer.

For a given building block, a unit could incur three types of costs: deployment or redeployment, event flying-hours, and TDY. In the sections that follow, we discuss each of these cost elements and the data sources we used.

Deployment costs include the flying-hours used to get the Air Force aircraft from home station to the PN airfield where they will operate, the cost to transport the maintenance equipment to keep the aircraft operating, and the cost to transport the personnel performing the BP mission.

We derived cost per flying-hour (CPFH) for each aircraft from the Air Force Total Operating Cost (AFTOC) database.[9] For each MDS, we took the cost elements that vary by flying-hour and divided them by the total flying-hours for that MDS. We averaged the costs from 2008 to 2010. We show the details of these calculations in Appendix B.

We calculated the average distance from one European country to another to approximate the deployment distance for a typical aircraft deployment. We estimated this to be 500 miles, given that some deployments would be longer and some shorter. We then determined the typical block speed of each MDS to determine the average flight time for each MDS.[10] With the flight time and CPFH, we could calculate the cost to deploy each MDS. We multiplied this cost by the number of aircraft in each deployment.

All Air Force aircraft require some ground equipment to launch and recover sorties, as well as maintenance equipment to do repairs for longer deployments. To estimate the amount of equipment needed to support each MDS, we looked to the Manpower and Equipment Force Packaging System (MEFPAK) to see what deployments of different sizes would require. When

[9] Data from AFTOC database for 2008–2010.

[10] Aircraft block speed is an aircraft's true airspeed adjusted in relation to length of sortie to compensate for takeoff, climb-out, letdown, instrument approach, and landing. Air Force Pamphlet (AFPAM) 10-1403 lists the block speeds for mobility aircraft. We took these as stated for mobility aircraft and adjusted the combat aircraft flight speeds based on the rough proportions the document laid out. See AFPAM 10-1403, 2011.

our building blocks were smaller than the smallest force packages, we scaled them down, taking into account economies of scale. We assumed that mobility aircraft can self-deploy their personnel and equipment, so only fighters incur this additional cost.

To estimate the cost to the Air Force of deploying this maintenance equipment to and from home station, we used standard Air Mobility Command (AMC) rates and applied them to the cargo being transported.[11] For travel within Europe, we found this to be $1.073 per pound for cargo and $245 per person for passengers.[12] We acknowledge that, on some occasions, USAFE personnel drive their own cars to a PN base to do BP activities. We understand that this is the exception and, for the sake of simplicity of our cost analysis, assume that all personnel fly on military airlift (milair).

The Defense Travel Management Office (DTMO), an office in DoD, provides detailed per diem rates for travel to a range of countries and cities in the world.[13] Rather than do a record-by-record calculation of each historical BP event, we surveyed the range of costs found on the DTMO website and found the range to be usually between $200 and $400 per day per person (including hotel and food) for destination countries in western and eastern Europe that USAFE forces are most likely to visit. We estimated the total TDY cost for USAFE BP activities generally to be $300 per person per night, including hotel, food, and ground transportation.

During a BP activity, the only cost incurred other than TDY costs (if any) are the cost to operate the aircraft. We calculated this by estimating the number of hours flown during the mission and multiplying by the CPFH we described earlier. Redeployment costs simply mirror the deployment costs described earlier. Only aircraft missions will include flying-hour costs and the deployment of maintenance equipment.

Adapting Activities of U.S. Air Forces in Europe to Organizing Principles

In order to create alternative courses of action (COAs), we had to adapt some of the inputs and sometimes the building blocks themselves. We now discuss these changes and the implications they have for building-block costs.

For the alternative organizing principles, we made two sets of changes to the building blocks themselves (not including what is actually included in the total organizing-principle calculation). First, all BP activities are generated from CONUS, so all deployment factors (e.g., distance, time, cost) are adjusted for a deployment from CONUS to Europe. This includes changing the milair rates, so cargo increases from $1.073 per pound to $2.62 per pound and plane tickets increase from $243 to $1,400 per person each way. The deployment distance increases from 500 miles to 5,000 miles (the approximate distance from the middle of the United States to the middle of Europe), so the deployment flying-hours go up by an order of magnitude (though aircraft sorties become slightly more efficient because of longer duration).

For fighters, we also add a tanker air bridge to help deploy (and redeploy) the aircraft, such that each six-ship of fighters requires two KC-135 sorties. This adds about $33,000 each way to the deployment costs of a six-ship of fighters.[14]

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[11] FY 2011 U.S. Transportation Command (USTRANSCOM) tariff rates, derived from data provided to RAND.

[12] FY 2011 USTRANSCOM tariff rates.

[13] DTMO, undated, queried August 26, 2011.

[14] The planning factors and assumptions for the air bridge are adapted from a RAND analysis of alternatives for KC-135 recapitalization. The analysis is not releasable to the public.

The second change is that we repackaged any sorties flown from home station into discrete deployment packages of aircraft and personnel and assign to them deployment and TDY costs. So, for example, what had been 18 KC-135 sorties flown each month from home station (by the 100 ARW) became a one-week deployment of four KC-135s each month. These aircraft would fly the same total number of sorties the original building block contained but would have to deploy forward and redeploy to accomplish them. When we calculate total organizing-principle costs later, we include these increased deployment costs and adapted home-station sorties.

Building-Block Cost Calculations

In this section, we review the details of a few example building blocks in order to show the substance of the cost analysis. Because each wing's version of the same general building block (e.g., small aircraft deployment, large-team deployment) differs from the other wings, the permutations are too many to show here in detail. Instead, we show a few building-block examples to illustrate the details of our cost-analysis method and then show the aggregate results.

Table 3.8 shows the detailed costs for three of USAFE's BP building blocks.

We start from the left with the 52 FW large-aircraft deployment and go from the top down to discuss each data element. The 52 FW flies F-16s, so we based our costs and factors on that MDS. This building block has 16 aircraft and 250 people deploying for 15 days. Given wing input, we estimated that they fly 480 sorties (16 aircraft flying one sortie per day for 15 days). These sorties average 2.5 hours, resulting in 1,200 flying-hours during the BP event. Given the average distance to deploy within Europe (500 miles), the estimated block speed of an F-16 (424 mph, not shown here), the average deployment time within Europe for an F-16 would be approximately 1.18 hours.[15] According to our data analysis (shown in Appendix B), the average CPFH in USAFE for an F-16 is $6,442. TDY costs are $300 per person per day, and each person's plane ticket costs $245 each way. Shipping costs for equipment are $1.073 per pound, and, according to MEFPAK data, that deployment would require 100 short tons of aerospace ground equipment.

When we total each set of costs, we find that the plane tickets cost $57,330 (we decrement the number of plane tickets by the number of aircraft to reflect the pilots flying their own aircraft). It costs $214,600 to deploy the unit equipment and another $7,597 to fly the six aircraft. All of these costs are one way. Therefore, the total cost to deploy and redeploy the unit for this building block is $1,274,387.

The event flying cost is simply the total flying-hours during the event times the CPFH, which equals $7,730,396. The TDY costs equal the people times the days times the daily TDY cost. In this case, this totals $2,250,000. The total cost to generate one building block one time, then, is $11,254,783, and this wing typically flies three of them per year. Keep in mind that the event flying-hours, which are usually for the USAFE wing's own training, come out of the regular flying-hour budget. In this case, the event flying-hours are a little more than half of that cost.

Next, we describe the home-station sorties flown by the 100 ARW at RAF Mildenhall. As described earlier, the 100th regularly flies air refueling sorties from home station to provide opportunity for PN air forces to practice receiving. Some of the data cells are blank because

[15] Estimated block speed is the true airspeed in knots under zero wind conditions adjusted in relation to the length of the sortie to compensate for takeoff, climb-out, descent, instrument approach, and landing.

Table 3.8
Example Building-Block Cost Elements

Building Block	52 FW Large Aircraft	100 ARW Sorties	CRG Large Team
MDS	F-16	KC-135	
Number of aircraft	16		
People	250		10
Days	30		7
Sorties	480	18	
Total flying-hours	1,200	93.6	
Hours per sortie (number of flying-hours divided by the number of sorties)	2.5	5.2	
Deployed flying-hours (average distance to deploy within Europe divided by the estimated block speed of the aircraft)	1.18		
Tons of equipment	100		
CPFH ($)	6,442	8,214	
TDY ($)	300	300	300
Plane tickets, each ($)	245	245	245
Shipping cost ($ per pound)	1.073	1.073	
Plane tickets, total ($)	57,330	—	2,450
Equipment shipping ($)	572,267	—	—
Aircraft deployment ($)	7,597	—	—
Deployment cost ($)	1,274,387	—	4,900
Event flying cost ($)	7,730,396	768,842	—
TDY cost ($)	2,250,000	—	21,000
Building-block cost ($)	11,254,783	768,842	25,900
Occurrences per year	3	12	3

these sorties are flown from home station. This building block has KC-135s flying from home station (thus no deployment inputs), accomplishing 18 sorties, each with an average duration of 5.2 hours, resulting in a total of 93.6 flying-hours for this building block.

This building block requires no deployment of aircraft or equipment, so those cells are also blank. We calculated a CPFH for USAFE's KC-135s of $8,214. As we move down the list, we see that there is no cost for plane tickets, shipping equipment, or deploying the aircraft, so the total deployment cost is zero. The event flying cost is again the flying-hours times the CPFH, or $768,842. There is no TDY cost, because no one leaves the base. Finally, the 100th performs this building block (i.e., that many tanking sorties) once per month.

For the last example, we discuss the 435 CRG's large-team deployment. This event has no aircraft costs, only costs for personnel. This building block has ten people deploying for seven days. The plane tickets cost $2,450 each way, so the total deployment cost equals $4,900. The TDY costs for ten people deploying for seven days equals $21,000, so the total building-block

cost equals $25,900. The 435 CRG typically does three iterations of this building block per year.

Wing Costs for Building Partnerships

In this section, we show the total costs of each wing's BP activities as they currently operate. Figure 3.3 shows these costs for one year.

The 100 ARW's BP activities cost about $12 million per year. Most of these are home-station sorties, so it is relatively inexpensive in relation to most other wings. The fighter wings total about $40 million, $107 million, and $26 million per year for the 31st, 48th, and 52nd, respectively. One reason that the 48th's costs are significantly higher than those of the other fighter wings is that the 478th flies F-15s, which have a much higher CPFH than F-16s. For comparison, note that the $87 million for event flying-hours for the 48 FW is roughly 11 percent of that wing's annual flying-hour budget.[16]

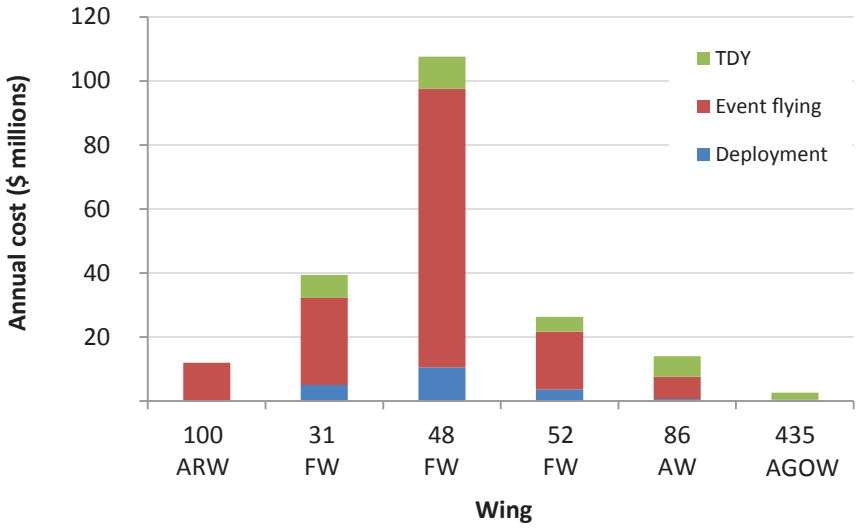
The 86 AW activities total about $14 million per year, about half of which is event flying-hours. Finally, the 435 AGOW costs a comparatively low $2.5 million per year. Without aircraft, the 435th looks rather small compared with the other wings.

These total costs we calculated are not reflected exactly in any USAFE data set; our costs should be higher. As we discussed earlier in this report, some BP events are not currently captured in USAFE's data-collecting regime. The wing building-block costs provided here are based on our synthesis of USAFE data and direct input from each wing. Further, we capture costs from a total Air Force perspective, not simply the direct costs paid by USAFE.

Aggregate Cost-Analysis Results

Figure 3.4 shows the total costs of each organizing principle, broken out by cost category.

Figure 3.3
Costs of Wing Activities for Building Partnerships

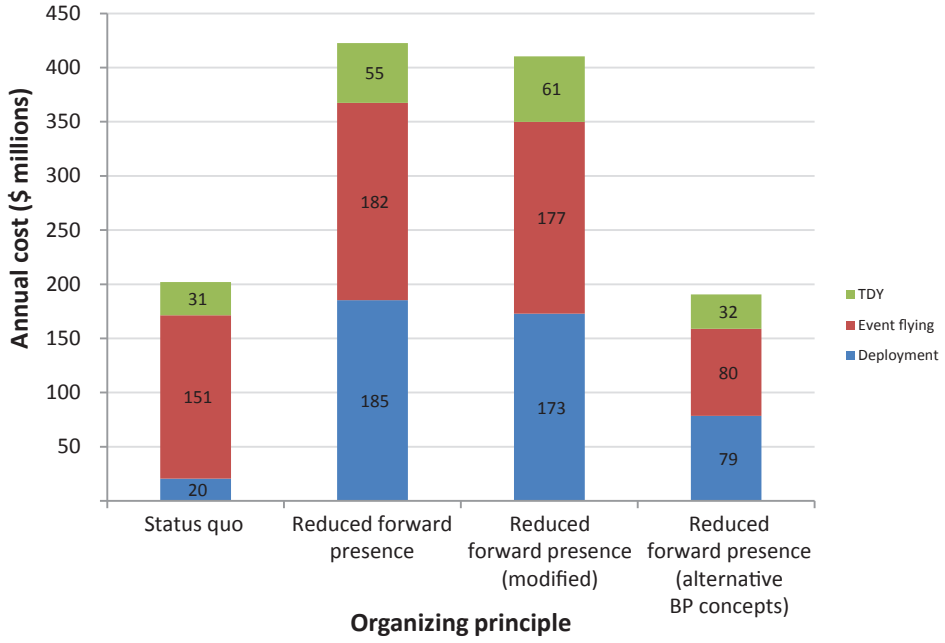


NOTE: We found 545 total events.

RAND *TR1241-3.3*

[16] AFTOC database data for 2008–2010.

Figure 3.4
Costs of Organizing Principles, by Cost Category



RAND *TR1241-3.4*

In Figure 3.4, our organizing principles are shown on the x-axis. On the y-axis, the height of each column shows the total annual cost (in millions of dollars) to replicate all BP activities appropriate to that organizing principle (we explained earlier in this chapter which organizing principles included which types of building blocks). The value of each cost category is shown inside each colored column (in millions of dollars).

On the left, "status quo" shows the costs we estimated for all USAFE-based BP activities for one year, essentially as they are performed today. Home-station sorties are, in fact, flown from home station, and aircraft and team deployments occur (as we understand them) for each wing on an annual basis. Keep in mind that the costs reflected here are the total cost to the Air Force but may not all be borne by USAFE directly (e.g., USAFE would typically transport personnel and equipment by means of its own organic airlift, thus not incurring the AMC costs to transport them).

Here, we can see that the event flying costs, at $151 million per year, dominate the costs. One implication of this is that these BP activities, when conducted from USAFE, are relatively efficient: Three-quarters of the costs go directly to training. Assuming that those flying-hours would normally be included in each wing's training program, we find that the *marginal* cost of USAFE BP activities would be approximately $51 million per year. Again, not all of these will be borne by USAFE. For example, some money is provided by EUCOM for JCS exercises and other activities, which would be applied to deployment and TDY costs.

Moving from left to right, we see that replicating all activities from CONUS incurs an enormous cost penalty, almost doubling the total costs. TDY costs approximately double, and deployment costs increase almost tenfold. The modified CONUS option saves a little because it repackages some of the deployments more efficiently and eliminates air shows and flybys.

The rightmost option halves the remaining aircraft-related events, thus bringing the total costs more in line with the status quo. However, less than half of the $186 million goes directly to training, a relatively inefficient use of resources.

We now look at these data in a slightly different way to explore some of the policy trade space. Figure 3.5 shows the same data as Figure 3.4, but divided by wing rather than by cost category.

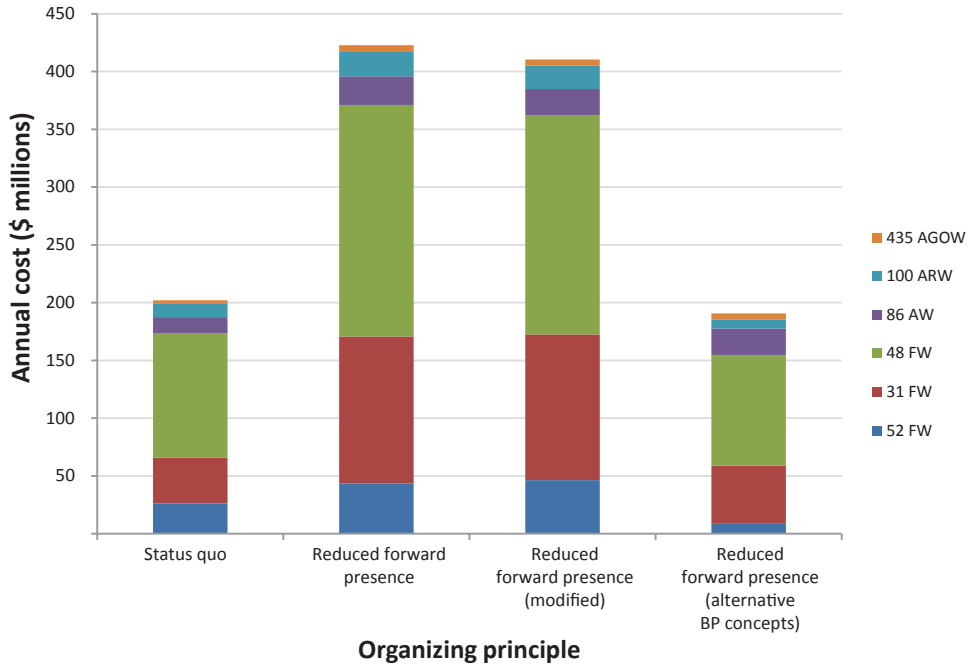
Ideally, when assessing alternative means of providing BP, one could differentiate among types of activities. Should the Air Force provide as much JTAC training as it does today for NATO countries? More? Less? What would happen if advanced USAFE partners did not have the opportunity to do DACT with Air Force forces? Answering these questions could provide a kind of menu of options for considering the costs and benefits of particular BP activities.

Unfortunately, the data available on USAFE BP activities do not provide enough granularity to explore those questions in detail. Indeed, if decisionmakers were considering posture changes for forces in Europe, it would be informative to see the costs of each activity to weigh their perceived value against the costs and risks of moving forces.

Figure 3.5 shows our annual BP costs according to the wing that provides them. This offers a tool (albeit a crude one) to help think through the specific costs incurred or saved by performing each wing's BP activities from USAFE or CONUS.

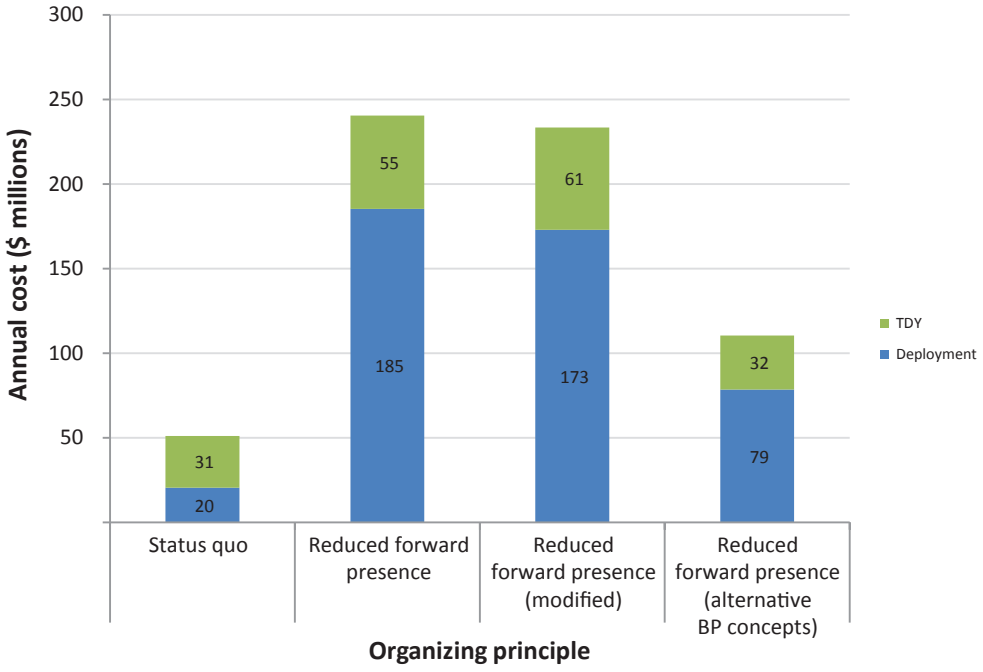
We now display these one more time, to focus on the cost differentials between operating from USAFE and CONUS. Figure 3.6 shows the same data as the previous two charts, excluding all event flying-hour costs, given that each wing would fly its needed training sorties whether or not it also offered BP benefit.

Figure 3.5
Costs of Organizing Principles, by Wing



RAND *TR1241-3.5*

Figure 3.6
Costs of Organizing Principles Without Event Flying Costs



RAND *TR1241-3.6*

As shown in Figure 3.6, status quo costs about $51 million per year as a marginal cost to provide current BP activities in USAFE. The difference between the status quo and each of the alternative organizing principles is $189 million, $182 million, and $59 million, respectively. When each of these costs is viewed as "the marginal cost to provide BP activities in USAFE," the status quo seems obviously superior from a cost perspective.

However, two potential costs that USAFE could incur might change the relative costs. First, HQ USAFE manages an aircrew training fund that is an additional source of training money above and beyond each wing's annual flying-hour budget. This money, managed by USAFE Training (USAFE/A3T) and dispensed to USAFE's wings, is essentially a marginal cost that USAFE incurs to have forces forward positioned in Europe and keep them trained. The training fund covers a range of expenses, such as travel per diem, transportation, air travel, and freight shipping. It does not include flying-hours.

From a posture perspective, one could add the size of that fund to the "status quo" column on the left to help think about the relative cost savings of providing BP from USAFE rather than from CONUS. However, this is possible only if part of the decision calculus is to pull forces currently positioned in USAFE back to CONUS to operate from there (e.g., repositioning the 31 FW from Aviano back to CONUS), thereby eliminating that unit's consumption of the aircrew training fund.

The FY 2011 aircrew training fund budget was $1.56 million for the mobility air forces (MAF) and $26.98 million for the combat air forces (CAF).[17] So, returning to Figure 3.6, we see that, even with the training fund, the marginal cost to provide BP from USAFE (status

[17] Aircrew training fund budget numbers were provided via email on September 30, 2011, by USAFE Directorate of Air and Space Operations, Operations and Training Branch (USAFE/A3TO) personnel.

quo) is lower than the cost of any of the CONUS alternatives we explored. The second cost USAFE could incur to have forces positioned forward is simply the relative cost difference between operating like forces in USAFE rather than in CONUS. If forces were more expensive to operate in USAFE, whatever the cause, one could reason that pulling those forces back to CONUS, simply because of the cost differential, would save money. We entertain that question in more depth in Appendix B, but the next section provides a brief overview.

In our operating-cost comparisons, we saw that USAFE incurs significantly lower CPFH than does Air Combat Command (ACC) for CAF MDS. CPFH, for example, were usually about 20 to 25 percent less in USAFE. Most costs for CAF MDS are driven by significantly lower consumption of training munitions and depot-level reparables (DLRs). We argue that this is probably due to different operating conditions (e.g., less-strenuous flying, more-restrictive flying conditions) and the nonlinear failure rates of spare parts.[18] (USAFE flies more hours per aircraft than does ACC, so the nonlinearity of part failures would logically reduce the per-flying-hour costs.)

Nonflying costs (e.g., personal and base support) appeared to be very similar between USAFE and ACC for the same CAF MDS, given the differences in wing size and potential USAFE cost-sharing arrangements.

For the KC-135, we saw that both flying-hour and nonflying operating costs were significantly *more* expensive in USAFE than in AMC. These differences may be due to fewer flying-hours per aircraft (so part failures, which are often sublinear, are amortized over fewer flying-hours) and to the small wing size of the 100 ARW.

Concluding Thoughts for Cost Comparisons for U.S. Air Forces in Europe

So what does all this imply for our analysis? The point of these cost comparisons is to understand two things. First, without changing USAFE's baseline level of BP activities, what might the cost differentials summarized in the previous section imply about the relative trade-offs of doing BP from USAFE versus CONUS? Second, how can the answers to the first question inform a more strategic risk assessment of moving USAFE forces?

We laid out several organizing principles earlier in this chapter that entertain essentially two alternatives: (1) operating aircraft from forward-positioned bases in USAFE and performing (or not performing) BP and (2) repositioning those aircraft back to CONUS to operate them and performing BP (at whatever level) in USAFE by deploying forces forward. From a total cost perspective, assessing those two alternatives requires an assessment of two components: the *direct operating* costs associated with basing and flying a unit's aircraft and the *marginal* costs associated with performing BP activities.

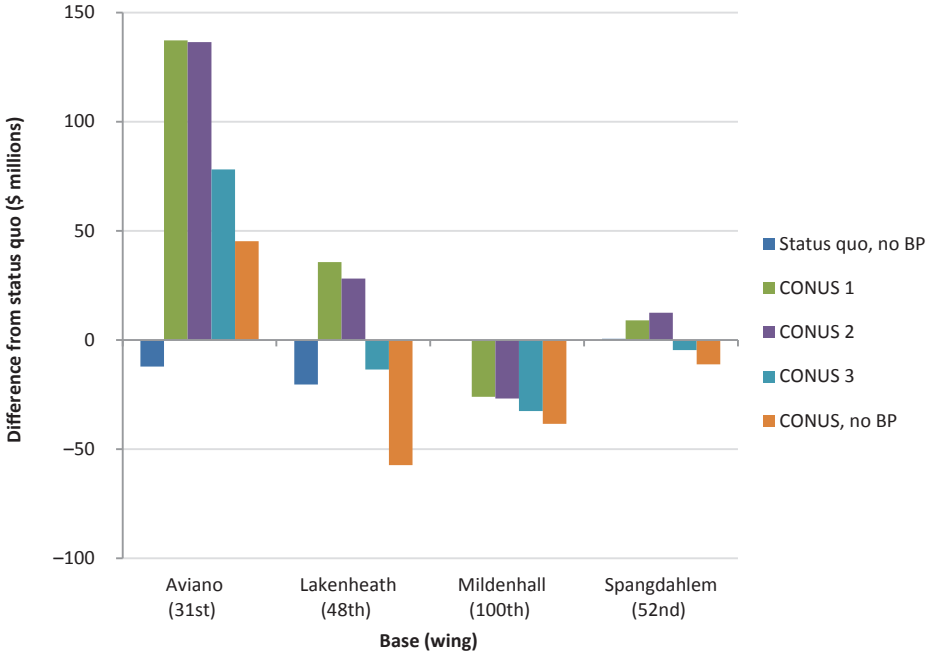
To address these questions, we performed a few more calculations to bring this into focus. Figure 3.7 shows the first of these comparisons.

Figure 3.7 shows, for four USAFE wings, the net difference in annual operating budget when comparing USAFE's status quo and our various organizing principles.[19] Each column

[18] HQ USAFE personnel confirmed that USAFE CAF pilots use significantly fewer munitions than their ACC counterparts because of European range restrictions. They informed us that, to return to full readiness before a deployment, USAFE CAF pilots visit RED FLAG to fully requalify to fire required munitions (teleconference on September 30, 2011, with USAFE Plans and Requirements International [USAFE/A5I] personnel).

[19] In this cost comparison, we ignore any one-time costs associated with moving a unit and instead focus on the dominant recurring costs.

Figure 3.7
Relative Cost Comparisons of U.S. Air Forces in Europe Wings and Organizing Principles



NOTE: CONUS 1 = entire wing is moved to CONUS, operates as ACC currently does, and performs BP under the organizing principle of reduced forward presence. CONUS 2 = same as CONUS 1 but under the organizing principle of reduced forward presence modified. CONUS 3 = same as CONUS 1 but under the organizing principle of reduced forward presence with alternative BP concepts. CONUS, no BP = same as CONUS 1 but performing no USAFE BP from CONUS.

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includes the entire flying-hour budget, plus all nonflying costs (e.g., personnel, base support), and shows the net difference (cost or savings) from the status quo as articulated in our building-block analysis earlier (i.e., today's USAFE operations as currently reflected in the cost data). If a column is above zero, there is an additional cost over the status quo; if a column is below zero, it implies a net savings over the status quo. "Status quo, no BP" shows the total annual budget for each USAFE wing under current operating and basing assumptions, with no BP. (These are simply AFTOC costs minus the marginal cost to add BP calculated from our building-block analysis, i.e., the deployment or redeployment costs and TDY costs.) This option includes the cost of the aircrew training fund.[20]

The baseline status quo and the first column (status quo, no BP) include one additional cost. DoD incurs additional marginal costs in pay and permanent change of station (PCS) moves to support each person in a permanent overseas position. We estimated these costs using recent budget data provided by the Air Force (Department of the Air Force, 2011). We estimated the average annual cost to sustain a permanent overseas position to be about $25,000

[20] We distributed the total aircrew training fund across these wings by prorating the cost based on the relative number of annual flying-hours each wing flew.

per year, including both overseas pay and PCS.[21] Each wing's total includes these marginal costs for all mission-related personnel (e.g., pilots, maintainers) and additional base support personnel who would be realigned if the operational unit moved.[22] This helps capture the relative cost of maintaining each wing in USAFE versus CONUS.

Farther to the right, "CONUS 1" shows the potential cost difference if the entire wing moved to CONUS, operated as ACC currently does, and performed BP according to our "reduced forward presence" organizing principle (thus saving those marginal pay and PCS costs described earlier). "CONUS 2" shows the same cost difference as "CONUS 1" except using our "reduced forward presence, modified" organizing principle. "CONUS 3" shows the same cost difference as "CONUS 1" and "CONUS 2" except using our "reduced forward presence, alternative BP concepts" organizing principle. Finally, "CONUS, no BP" shows the cost difference if the entire wing moved to CONUS but performed no USAFE BP from CONUS.

We must make clear that these calculations assume that USAFE aircraft repositioned to CONUS would eventually be operated and based as their ACC and AMC counterparts are today. That assumption seems reasonable for basing because smaller squadrons of aircraft would likely be absorbed by larger wings and would gain their natural economies of scale. It also is reasonable to think that the aircraft would be operated the same. Our analysis in Appendix B shows that there is not a significant difference between the experience levels of pilots and maintainers between USAFE and ACC or AMC (for USAFE's MDSs), so we can assume that the pilots would need the same type of training and that the maintainers would exhibit the same expertise and judgment. Further, any restrictions present in Europe would no longer apply to the repositioned forces, so their training regimens, if currently different, would presumably fall in line with those more typical of ACC and AMC.

The results in Figure 3.7 are mixed. In general, the USAFE options are less expensive than the CONUS options. For Lakenheath, BP activities must be halved to become less expensive than USAFE. For Mildenhall, because of the relatively high operating costs for the KC-135s, all CONUS options are less expensive than those for USAFE. Keep in mind that all of these differences are within a few percentage points of total annual operating costs.

For illustration, we show the total cost of all five USAFE wings with aircraft (including the 86 AW), with the same five policy options along the x-axis, plus the baseline status quo costs.[23]

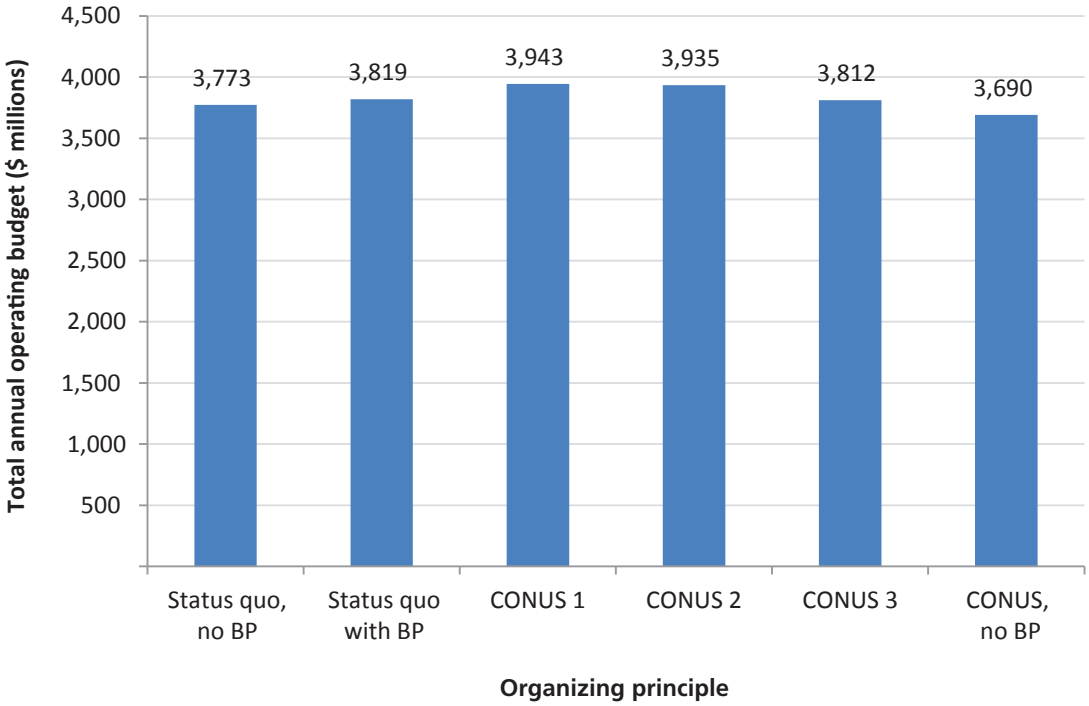
We observe several things from Figure 3.8. First, conducting today's USAFE BP activities from USAFE is, on the whole, less expensive than replicating them from CONUS. USAFE BP activities would need to be halved to become cost-competitive with USAFE's current BP activities. Status quo with BP and CONUS 3 are virtually identical. CONUS, no BP, is about 3 percent less expensive than status quo with BP and about 2 percent less than status quo without BP. All of these costs are extremely close (USAFE's operating budget has changed more than 2 to 3 percent per year in recent years), and they do not include any costs to relocate the

[21] We estimated pay separately for officer and enlisted but show the estimate based on a weighted average of personnel balance between current officer and enlisted positions. We assume that most USAFE positions would include dependents, which adds slightly to the pay increase.

[22] Analysis of AFTOC data showed a marginal increase or decrease of 0.4 base support personnel for each mission-related person. So, a decrease of 1,000 mission personnel from a unit would take with it approximately 400 base support personnel.

[23] For these calculations, we exclude the 86 AW's C-21s. In the context of these posture options, moving the C-21s back to CONUS and replicating their current sorties to European countries seemed unrealistic.

Figure 3.8
Summary of Total Cost Comparisons of Organizing Principles



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units back to CONUS units and provide facilities for them to operate. This implies that, in order to be cost-competitive in the long run, all five of these wings would have to be relocated to CONUS and all BP activities would have to be ceased.

For the 100 ARW and 86 AW, the flying and basing costs are apparently less in CONUS than USAFE, so selectively moving those units (odd as that might be given the realities of USAFE's current bases and operations) could theoretically garner an annual cost savings in the tens of millions of dollars. The key policy question, then, is *what is at risk by moving some or all USAFE's forces*, and is that worth a few million dollars per year?

Key Findings from the Cost Analysis

We now summarize the key findings from our cost analysis. These four findings assume a fixed force structure and baseline level of BP activity.

USAFE's current BP activities are relatively efficient. For aircraft events, the majority of the event costs go to event flying-hours. Because these flying-hours are already part of the training budget, they are a sunk cost, providing BP for "free" as an ancillary benefit. Nonaircraft events do not take advantage of this sunk cost, but they are a small percentage of the overall annual costs of BP in USAFE (about 2 percent). Second, USAFE wings spend about 7 to 12 percent of their flying-hours on BP activities. All things considered, they are able to leverage a significant portion of their flying-hour budgets (thousands of hours per year) toward BP. Third, USAFE wings accomplish a significant amount of BP with sorties flown from home station and therefore do not incur additional costs for travel and deployment. We estimate that, in a given year,

some fighter wings would fly one-third to one-half of their BP flying-hours from home station, and the 100 ARW would fly nearly all of its BP flying-hours from home station.

USAFE's current BP activities add only a marginal cost to USAFE's overall annual operating costs (roughly 1.5 percent). We did not assess the relative value of USAFE's current BP activities, nor their contribution to EUCOM or U.S. strategic objectives, but USAFE wings accomplish many thousands of hours of BP activities with PNs for the additional costs they incur.

Generating USAFE's current BP activities from CONUS could greatly increase the marginal cost of providing BP. If USAFE's current BP activities were replicated from CONUS, the marginal cost to provide BP could increase more than fourfold, from $51 million per year to $240 million per year.

If USAFE forces were moved to CONUS, some BP activities would need to be significantly curtailed to be cost neutral with regard to direct BP costs. In our fourth organizing principle, we assessed the cost of replicating only about half of USAFE's status quo BP activities. Even then, the marginal BP costs (see Figure 3.6) would be more for CONUS than for USAFE's status quo of activities, and the total operating costs (see Figure 3.9) would be comparable. Strategically, however, halving BP activities could have a deleterious effect on the U.S. ability to sustain access, build capability, and maintain relationships in a theater critical to U.S. alliances and global reach.

Finally, although the marginal costs to provide BP in USAFE are very sensitive to whether forces are located in Europe versus CONUS, these changes still have a small overall budget impact relative to total USAFE operating costs. The changes we contemplated could potentially change the budget by up to a few percentage points; USAFE's operating costs have changed by that much or more from year to year recently. Ultimately, many of the costs and savings we have contemplated in the discussion in this chapter are small when compared with the USAFE budget: the aircrew training fund, the cost to provide BP, the additional cost to provide BP from CONUS, and potential costs or savings in unit training costs from operating USAFE forces in CONUS. All of these costs matter from the standpoint of prudent management and spending taxpayer dollars wisely. But the fact that these costs and savings are so small relative to the overall operation of USAFE forces ought to turn attention back to the benefits of having USAFE forces provide BP and from being positioned in Europe more generally and to what is risked by changing those things.

CHAPTER FOUR

Conclusions and Recommendations

Overall, the study team's conclusion is that, provided DoD's priorities do not change and if the United States maintains the current presence and posture in Europe, USAFE's BP efforts are cost-effective. Our analysis indicates that USAFE forces are doing BP as part of their daily routine. BP permeates the everyday activities of the HQ staff, as well as those of the six wings we surveyed. BP is often included as a core element of USAFE training and certainly contributes to increased effectiveness of coalition operations. Our analysis also indicates some missed opportunities that, if addressed, can help to better capture the USAFE BP "story," as well as potentially make USAFE BP activities more effective and efficient.

This final chapter includes two main sections. The first presents and discusses the study team's key conclusions under four main categories: mission and outreach, training and operational benefits from BP, tracking and reporting processes, and cost. These categories flow from the more-significant issues identified and discussed in Chapters Two and Three. The final section presents the team's recommendations to the Air Force.

Conclusions

Mission and Outreach

USAFE does not appear to have adequately communicated its BP story in Europe in such a way as to affect the posture debate or to at least illustrate USAFE's peacetime BP mission. The depth and breadth of USAFE's BP activities are largely unknown outside of USAFE and certain offices in DoD and the Department of State. Key legislative committees in Congress are poised to make decisions regarding basing in Europe and are doing so without in-depth knowledge of the benefits of forward-based forces in helping to enable effective coalition operations, for example. More-targeted outreach to key congressional committees, the State Department, and policymakers in DoD on the Air Force BP mission in Europe would be a useful way to add BP into the debate on posture.

Forward basing facilitates important relationship- and capacity-building BP activities. There are some activities that can be done only from close in. Although security cooperation is not a primary driver of force posture in Europe, BP activities conducted with forward-based forces enable effective relationships, build partner capability and capacity, and help ensure access.

A significant portion of USAFE's BP activities is opportunity-driven rather than part of a broader country strategy. BP is often an ancillary benefit to U.S. training in and with partner countries. USAFE units exploit BP opportunities in the context of their own training; BP benefit is often a "free commodity" that accrues when USAFE units apply training funds. It is less

likely that CONUS-based forces could do the same, at least not at the same rate as Europe-based units. BP in Europe would likely suffer under CONUS basing options, yet the strategic effects of such a drop-off have not been adequately analyzed.

BP-related strategy and objectives at the country and event levels are not clear to the personnel and units that execute BP activities. Often, the broader picture and commander's intent for specific BP activities are not apparent at the wing level. It is not necessary for all airmen to have in-depth knowledge of the strategy behind each BP activity, but certainly wing and squadron leadership should have a clear understanding of the specific objectives and broader USAFE vision for the partner country so that they can execute effectively.

Training and Operational Benefits from Building Partnerships

Although many U.S. units and personnel derive training benefit from BP activities and presence in Europe, some get less benefit than others. Overall, we found that wing leadership and staff tend to view BP through the lens of supporting their own training and readiness requirements. Most respondents to our survey viewed BP-related activities as beneficial to their own training and readiness. Some events are not seen as productive in terms of maintaining U.S. readiness, including air shows, flybys, and air policing events. Overall, there are unique training opportunities that include allies and partners for every type of unit, but not every opportunity helps to maintain readiness.

The presence of forward-based forces can serve to facilitate coalition operations. According to discussions with USAFE personnel, the frequent, long-term interactions and collocation with partners that forward basing affords individuals and units in USAFE makes it easier to quickly initiate planning and operations from the AOR and in outside regions. The need to build relationships, capabilities, and access in the EUCOM AOR for coalition operations will continue beyond Iraq and Afghanistan. Partnerships with European friends and allies will be needed to sustain stability, deterrence, and assurance on the continent and to execute potential contingency operations—both from and with European PNs—in Africa, the Middle East, and beyond. Emerging requirements in such areas as BMD and cyber warfare will continue to drive cooperative efforts.

Some missed BP opportunities are worth pursuing. USAFE is taking advantage of opportunities to work with partners during training and exercises at and off home station mainly in eastern Europe, but more could be done. Many of these derive from events that could be better utilized to help build partnerships. These include hosting events and maintainer involvement in BP during off-station training events. In some instances, particularly in the 435 AGOW, respondents expressed a belief that they were being underutilized for BP activities.

Tracking and Reporting Processes

Existing USAFE reporting processes capture part of the BP level of effort in the command, but more BP events are occurring than is apparent from HQ-level data. Air Force BP events are broader and more numerous than those reported to HQ USAFE. They include community relations activities with the host country, familiarization visits to Air Force bases, and focused downrange training to improve a partner's capacity for coalition operations. With many BP activities being opportunity-driven from the wing level, some opportunities taken do not become opportunities reported.

BP data are subject to several reporting chains depending on the nature of the event and who is executing it. No single reporting regime captures security cooperation events. This is a DoD-

wide shortfall, and USAFE has improved reporting in the past several years. Data on BP events are often derived from other reporting processes (e.g., AARs on training events flowing from the unit to the USAFE operations staff). As a result, there is inconsistent or nonexistent reporting on important information that would support decisionmaking on force planning and posture, resources, and prioritization of activities.

There is some confusion at the wing level as to what exactly constitutes a BP event. Is it a planned and resourced activity? Does BP include tours of U.S. facilities by partner-country officials? Does it include impromptu events in which partner-country airmen observe or participate in Air Force training downrange? Overall, there is no clear definition of what actually is a BP event. The lack of a definition of *BP event* also hampers reporting and analysis.

Cost

USAFE's BP activities are relatively efficient. For aircraft events, the majority of the event costs go to event flying-hours. Because these flying-hours are already part of the training budget, they are a sunk cost, providing BP for free as an ancillary benefit. Second, USAFE wings spend about 7 to 12 percent of their flying-hours on BP activities. All things considered, they are able to leverage a significant portion of their flying-hour budgets toward BP. Third, USAFE wings accomplish a significant amount of BP with sorties flown from home station, which are essentially free. We estimate that, in a given year, some FWs would fly one-third to one-half of their BP flying-hours from home station, and the 100 ARW would fly nearly all of its BP flying-hours from home station.

USAFE's BP activities add only a marginal cost to USAFE's overall annual operating costs (roughly 1.5 percent). Evaluating the value of these activities is beyond the scope of this research, but USAFE wings accomplish many thousands of hours of BP activities with PNs for those additional costs.

Generating USAFE's BP activities from CONUS incurs significant additional expenses. Deployment costs for USAFE BP activities would increase significantly if replicated from CONUS—in some cases, by an order of magnitude. Further, USAFE's CAF wings appear to have lower operating costs than those in CONUS, so the cost differential could be more.

If USAFE forces were moved to CONUS, some BP activities would need to be significantly curtailed to be cost neutral with regard to direct BP costs. In our fourth organizing principle, we assessed the cost of replicating only about half of USAFE's status quo BP activities. Even then, both the marginal BP costs and the total operating costs would be more for CONUS than for USAFE's status quo of activities.

Recommendations

We direct our recommendations to HQ-level elements of USAFE and USAFE working in conjunction with the wings.

For the HQ USAFE level, we recommend the following actions:

- Ensure that BP and security cooperation are included in the force posture debate when it affects Air Force forces.
  - Broaden the understanding within the Air Force and among decisionmakers in DoD that the marginal cost of BP by USAFE forces is small, assuming that the current pos-

ture remains the same, and that the cost of replicating USAFE's current BP activities from CONUS could be substantially higher, even if BP activities were reduced.
  - Make decisions on posture changes to forces in Europe based on an assessment of whether any savings are worth the risk to access, leadership, and other core U.S. interests.
  - Direct that BP be emphasized in Air Force discussions on force posture in Europe with key congressional staff, the Office of the Secretary of Defense, and Department of State officials.

For USAFE working in conjunction with the wings, we recommend the following actions:

- Develop a BP strategy for engagement with European partners post–Operation NEW DAWN and Operation ENDURING FREEDOM.
  - Press efforts to develop air-related country plans in the AOR that enable linkages between theater objectives and USAFE BP events. Develop means of pushing this information to wings and other USAFE organizations.
  - Seek increased engagement with partners in the eastern region of the AOR focused on meeting operational requirements of contingencies in the CENTCOM AOR. This includes maintaining or expanding access to bases, airspace, and ranges by both combat and support assets and working with potential coalition partners on related operations.
  - Develop options (with EUCOM) for continuing to build partner capacity in niche areas with new members of NATO and less advanced partners in the AOR for future coalition operations. Continue pursuing ongoing efforts to build medical, JTAC, cargo preparation, and other capabilities, as well as institutional capacity.
  - Continue close cooperation in training and exercises with advanced partners in the AOR for future coalition operations. Interoperability and relationship-building at the individual, unit, and command levels are invaluable and affect both the capability and willingness to work with the United States in the AOR and beyond. This applies also to emerging air forces, such as that of Poland, which could someday become advanced partners.
- Streamline processes for data collection and analysis.
  - Consider ways to aggregate BP data and express the Air Force's BP successes. Use this report as a first step in making explicit linkages between force posture and BP.
  - Adapt existing reporting regimes across the air staff to capture the BP data required to make informed resourcing and other decisions. USAFE should determine the types of BP activities it absolutely needs to track, then focus on those specific types of activities in detail. This may include activities that best support EUCOM's Theater Campaign Plan objectives and activities that help to inform resourcing decisions.
  - Consider administering an annual survey, similar to the one used for this study, to supplement BP data already reported. Adapt the survey to answer questions that support USAFE and EUCOM decisionmaking requirements.
  - Define *BP event*, perhaps in accordance with the study team's proposed definition, and communicate this to the wings. We recommend that the Air Force consider adopting this definition: A BP event is a planned or unplanned activity that builds and sustains relationships with, capabilities of, or access to foreign partner militaries in accor-

dance with the combatant commander's theater and country objectives. In addition, BP events should be prioritized on the basis of this definition.
  - Adopt PAF methodology for assessing and costing BP level of effort to support resource and other decisions.

For the HQ USAFE level in coordination with the wings, we recommend the following actions:

- Take advantage of additional BP opportunities.
  - Develop concepts to expand and standardize hosting events and to take greater BP advantage of off-station events (especially maintainers) and share ideas with HQ USAFE.
  - At home station, consider increasing the frequency of visits by partner countries to USAFE bases (especially maintainers, logisticians, security forces, and mobility planners). Ensure that the activities scheduled address specific BP objectives for those partner countries.
  - Downrange, consider including additional NCO experts (again, maintainers are ideal) in selected BP activities.

Issues

As stated in Chapter One, the scope of this research was limited. It did not include EUCOM's or USAFE's relative importance across the other COCOMs or components or an assessment from current operational theaters about whether these BP activities translate to the operational realm. It also assumed no policy change with regard to BP from the Air Force or DoD.

The limited scope of the research and analysis offers opportunities for further work in this field. First of all, we did not have an opportunity to assess the relationships between presence, BP and security cooperation, and access in other AORs. A similar level of analysis would be very useful for U.S. Pacific Command (PACOM) and CENTCOM AORs, which are also contemplating basing options. Second, we did not focus our analysis on how and when partner countries grant access to or withhold access from U.S. forces. These decisions could be based on a historical analysis and case studies of partner willingness in peacetime, crisis, and conflict. Third, we did not have the time to assess in any comprehensive way the *effectiveness of BP activities in the USAFE AOR*. Although outside the scope of this effort, a deeper level of analysis of the real benefits of USAFE BP activities for the U.S. and partner countries is warranted in order to make informed decisions about where to continue, cut, or change existing BP programs and activities in specific countries. Fourth, the team identified data collection and reporting to supporting decisionmaking on BP as an issue, according to our review of the data and interviews, and suggested several possible ways to address this issue. However, a deeper study of the processes and reporting mechanisms is likely to reveal the best COAs. Fifth, we did not have the opportunity to comprehensively assess cost trade-offs between basing forces in USAFE versus in CONUS. In our analysis, we uncovered cost differences between USAFE and CONUS that we were not entirely able to explain. Further analysis could dig deeper into how each command differs in training requirements and operational restrictions to

better understand future implications of reposturing USAFE's forces. Such analysis could also include the costs to rebase flying wings in CONUS.

APPENDIX A

Survey Results: U.S. Air Forces in Europe Building Partnerships

This appendix provides the details of the study team's BP survey administered to USAFE forces in the spring and summer of 2011. The first section shows the survey template. The second provides the results. The survey template was approved by the Air Force and by RAND's Human Subjects Protection Committee.

Survey Template

The survey instructions read as follows:

> RAND Project AIR FORCE is conducting a study for [the commander of USAFE] to characterize and cost U.S. Air Force efforts to build partnerships and partner capacity (BP/BPC) in the USEUCOM AoR. This study is to be completed by October 2011. To help us assess the BP environment in which USAFE operates, we are asking you, as staff and operators in the field, to help us understand the opportunities and challenges you encounter in the context of formal and informal engagements with foreign military partners in [EUCOM].
>
> We request that you complete the attached questionnaire. This should take you no more than 15 minutes.
>
> Participation in this survey is voluntary. Let us know if you do not want to participate or you want to stop at any time. You should feel free to skip any questions that you prefer not to answer. There will be no negative consequences for you personally that result from your decision to participate or not.
>
> RAND will keep your responses strictly *confidential*. We will not disclose your identity or information that identifies you to anyone outside the research project, including the USAF, except as required by law. If you have any questions or concerns regarding your participation in this research, please contact the project co-leader, Mr. David Thaler (thaler@rand.org, 703-413-1100, ext. 5221), or the Human Subjects Protection Committee at RAND, [1776] Main Street, Santa Monica, CA 90407, 310-393-0411, ext. 6369.
>
> *Thank you*, in advance, for your time, your honesty, and your input.

Responses

We received total responses from 742 participants (see Figures A.1–A.3).

Figure A.1
Total Responses, by Wing

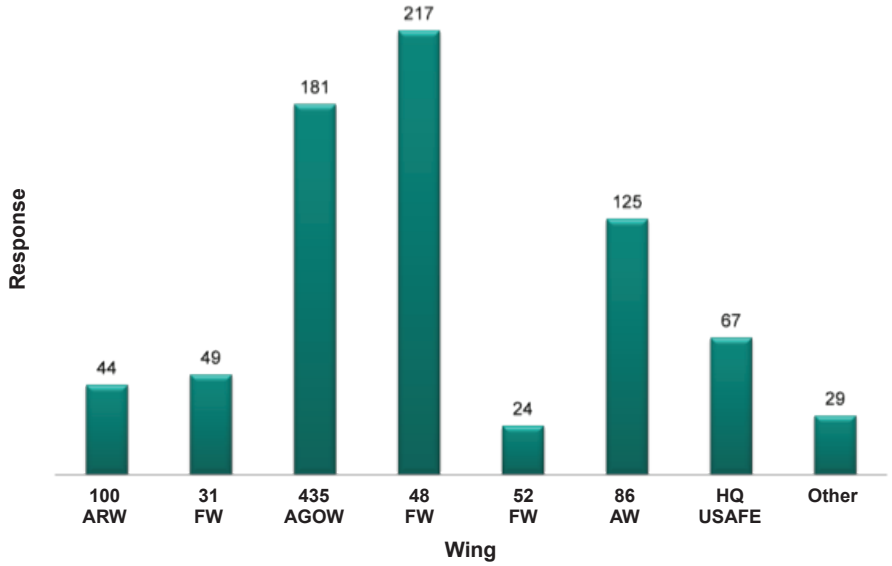

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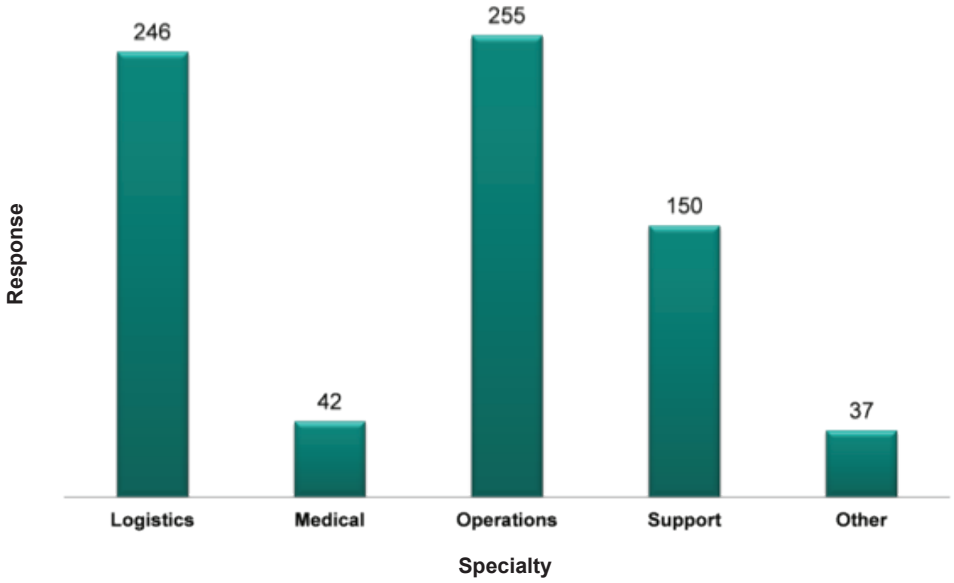
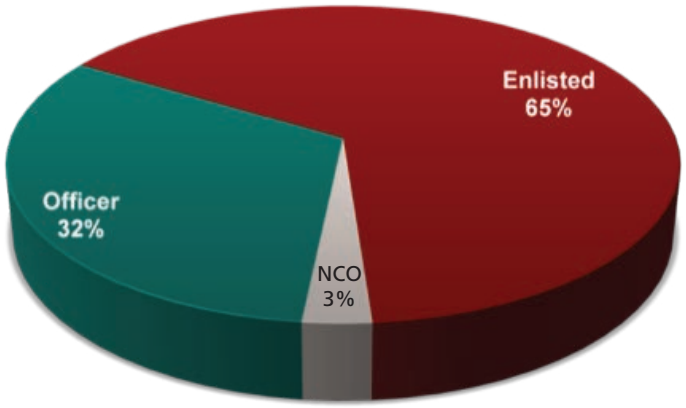
Figure A.2
Total Responses, by Specialty



RAND *TR1241-A.2*

Figure A.3
Total Responses, by Rank



RAND *TR1241-A.3*

1. Please indicate the following information.

Your squadron/division _____

Your flight (if applicable) _____

Your rank _____

Your duty [Air Force specialty code]: (ex: K11M3, 2A691) _____

2. How long in total (whether continuously or not) have you been assigned to USAFE? If less than a year, please enter "0" for years and then enter the number of months.

Years ___

Months ___

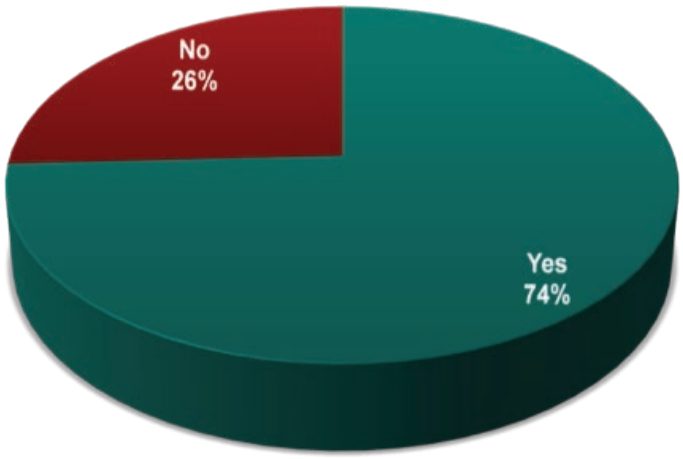
Average response was four years.

3. Do you participate in USAFE in activities that you would classify as BP/BPC? This includes major events, day-to-day interactions, informal communications, and community relations with host-/partner-country personnel. (See Figures A.4–A.6.)

___Yes

___No

Figure A.4
Level of Participation in Activities to Build Partnerships and Partner Capacity



NOTE: The survey item read, "Do you participate in USAFE in activities that you would classify as BP/BPC? This includes major events, day-to-day interactions, informal communications, and community relations with host-/partner-nation personnel."

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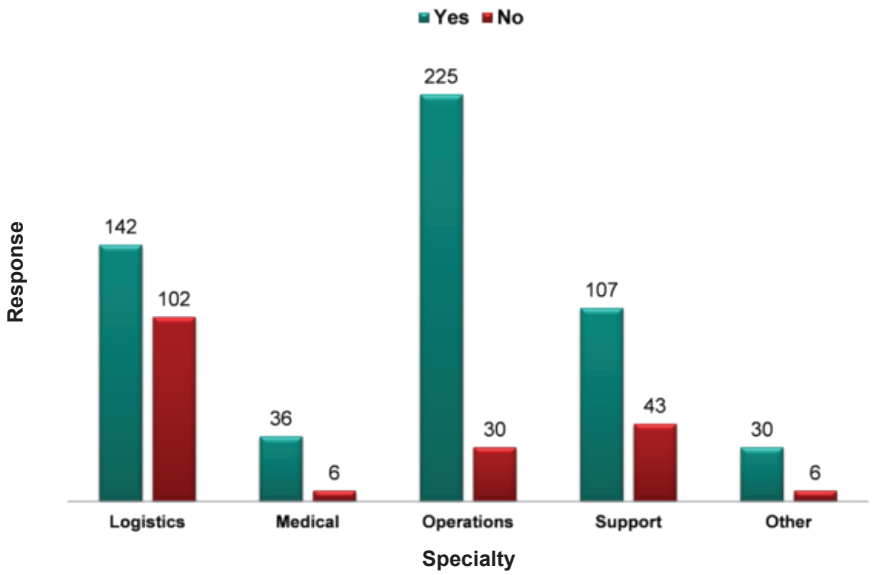
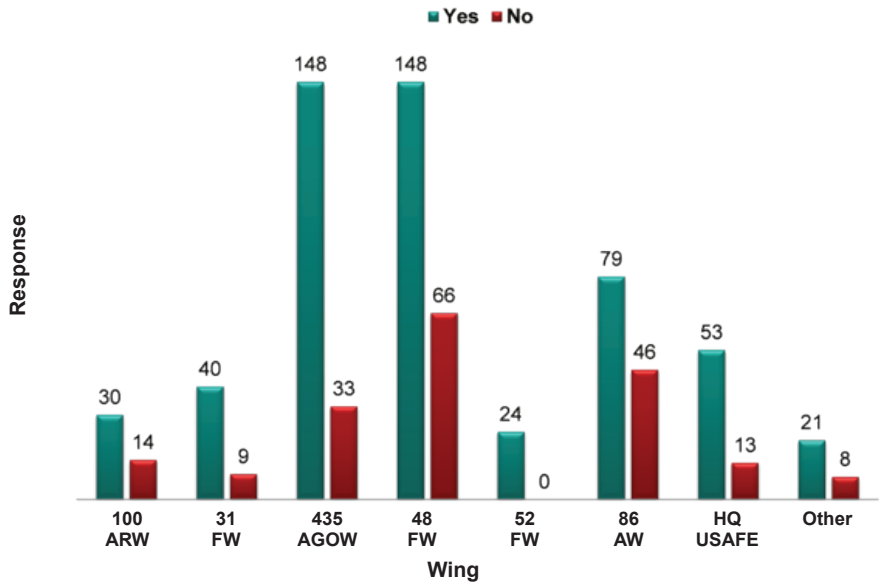
Figure A.5
Level of Participation in Activities to Build Partnerships and Partner Capacity, by Specialty



NOTE: The survey item read, "Do you participate in USAFE in activities that you would classify as BP/BPC? This includes major events, day-to-day interactions, informal communications, and community relations with host-/partner-nation personnel."

RAND *TR1241-A.5*

Figure A.6
Level of Participation in Activities to Build Partnerships and Partner Capacity, by Wing



NOTE: The survey item read, "Do you participate in USAFE in activities that you would classify as BP/BPC? This includes major events, day-to-day interactions, informal communications, and community relations with host-/partner-nation personnel."

RAND *TR1241-A.6*

4. If yes, how frequently do you participate in these activities? (See Figures A.7–A.9.)

___Never

___Less than once a year

___Once a year

___Once every 6 months

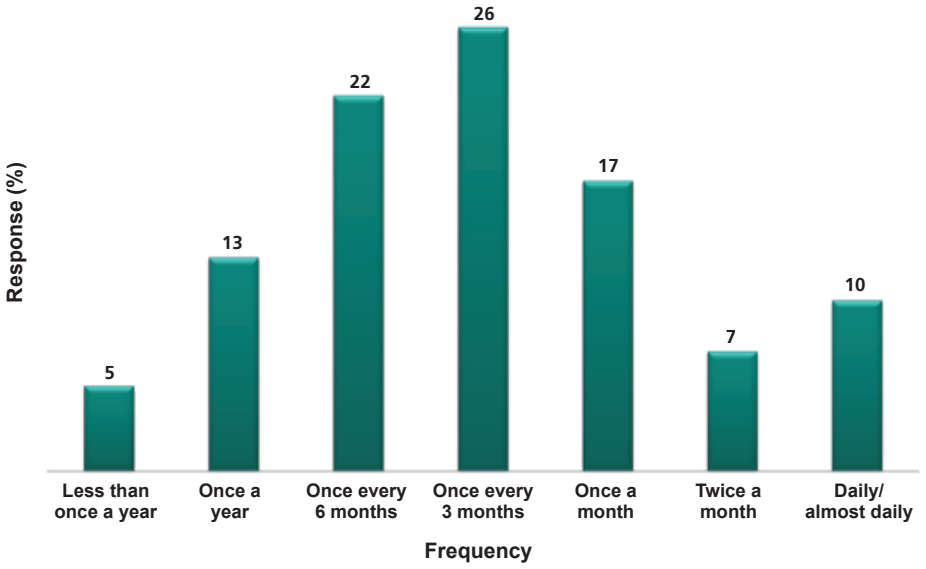
___Once every 3 months

___Once a month

___Twice a month

___More than twice a month (please specify)

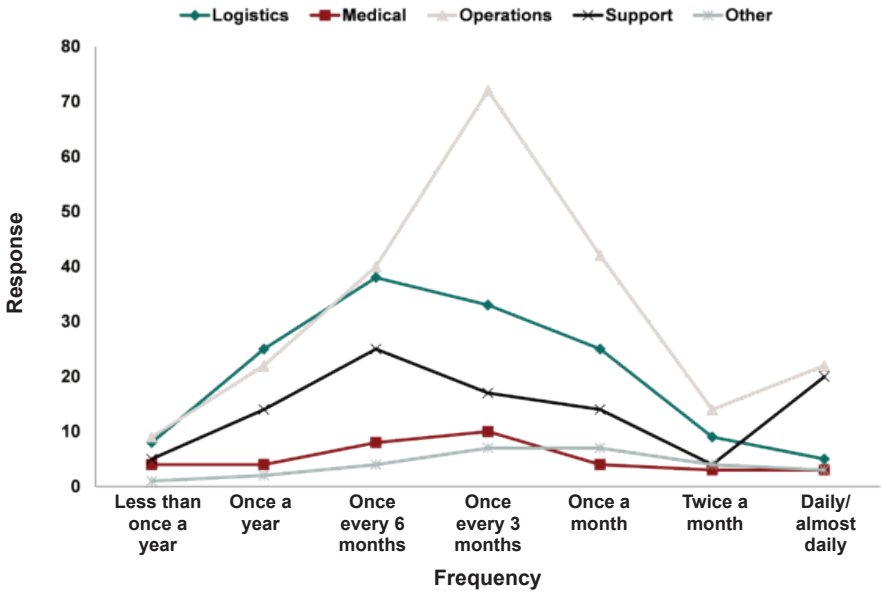
Figure A.7
Frequency of Participation in Activities to Build Partnerships and Partner Capacity



NOTE: The survey item read, "Do you participate in USAFE in activities that you would classify as BP/BPC? This includes major events, day-to-day interactions, informal communications, and community relations with host-/partner-nation personnel. If yes, how frequently?"

RAND *TR1241-A.7*

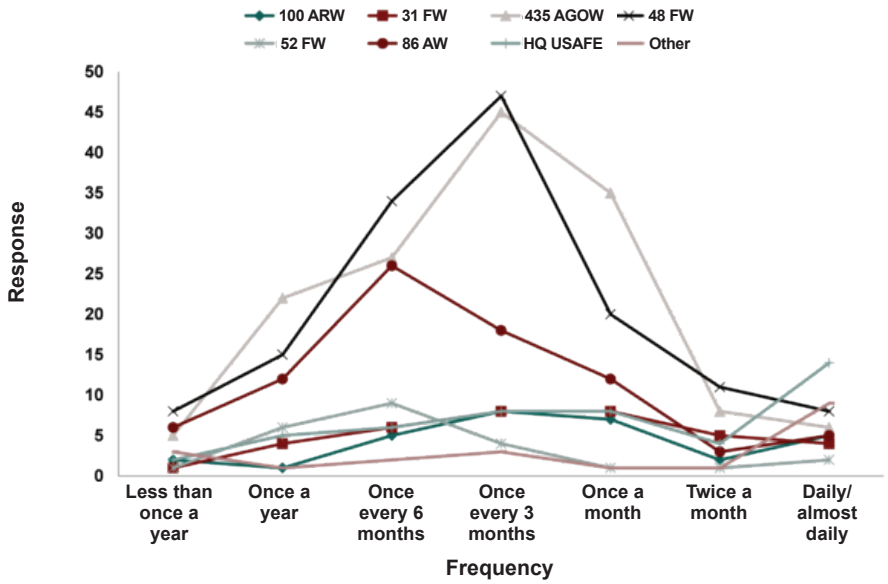
Figure A.8
Frequency of Participation in Activities to Build Partnerships and Partner Capacity, by Specialty



NOTE: The survey item read, "Do you participate in USAFE in activities that you would classify as BP/BPC? This includes major events, day-to-day interactions, informal communications, and community relations with host-/partner-nation personnel. If yes, how frequently?"

RAND *TR1241-A.8*

Figure A.9
Frequency of Participation in Activities to Build Partnerships and Partner Capacity, by Wing



NOTE: The survey item read, "Do you participate in USAFE in activities that you would classify as BP/BPC? This includes major events, day-to-day interactions, informal communications, and community relations with host-/partner-nation personnel. If yes, how frequently?"

RAND *TR1241-A.9*

5. On average, what is the duration of your participation in each activity? (See Figures A.10–A.12.)

___15–30 days

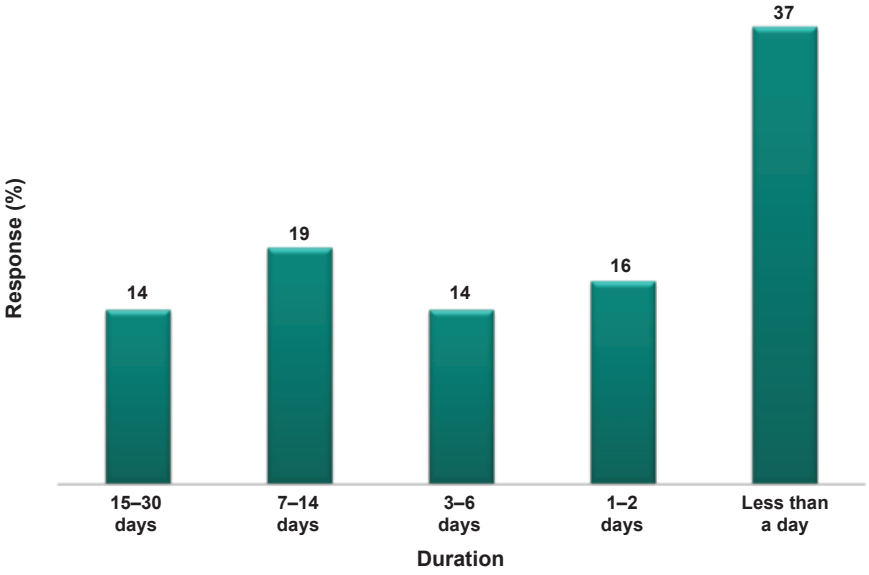
___7–14 days

___3–6 days

___1–2 days

___Less than a day

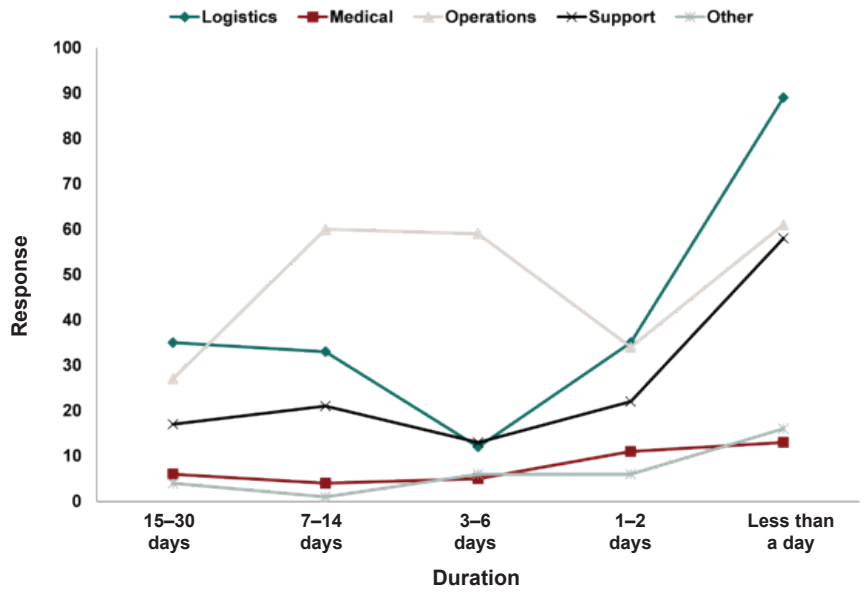
Figure A.10
Duration of Participation for Each Activity to Build Partnerships and Partner Capacity



NOTE: The survey item read, "On average, what is the duration of your participation in each activity?"

RAND *TR1241-A.10*

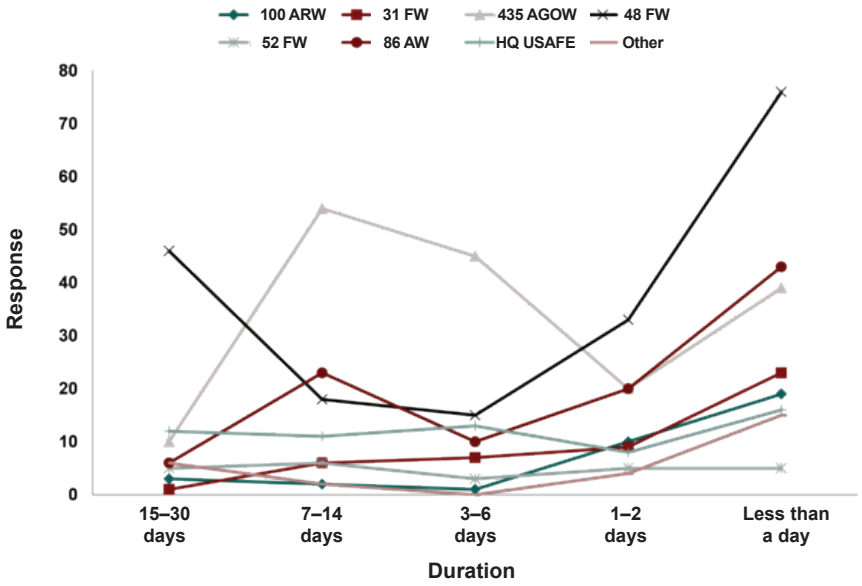
Figure A.11
Duration of Participation for Each Activity to Build Partnerships and Partner Capacity, by Specialty



NOTE: The survey item read, "On average, what is the duration of your participation in each activity?"

RAND *TR1241-A.11*

Figure A.12
Duration of Participation for Each Activity to Build Partnerships and Partner Capacity, by Wing



NOTE: The survey item read, "On average, what is the duration of your participation in each activity?"

RAND *TR1241-A.12*

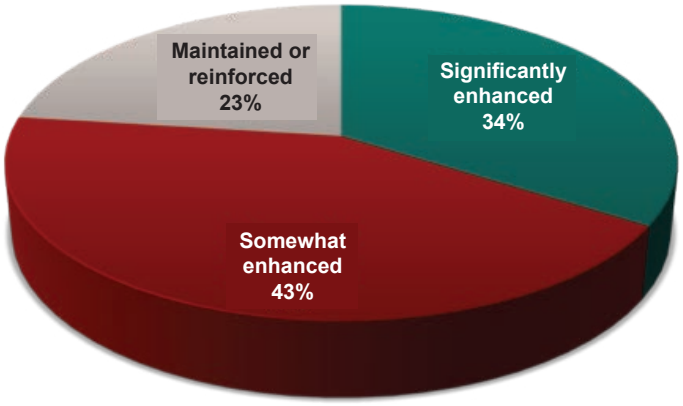
6. What effect has your participation had on your ability to work effectively with host-/partner-country personnel of other cultures and languages? (See Figures A.13–A.15.)

___Significantly enhanced my ability to work with partners

___Somewhat enhanced my ability to work with partners

___Maintained or reinforced an ability I already had to work with partners (please explain existing ability)

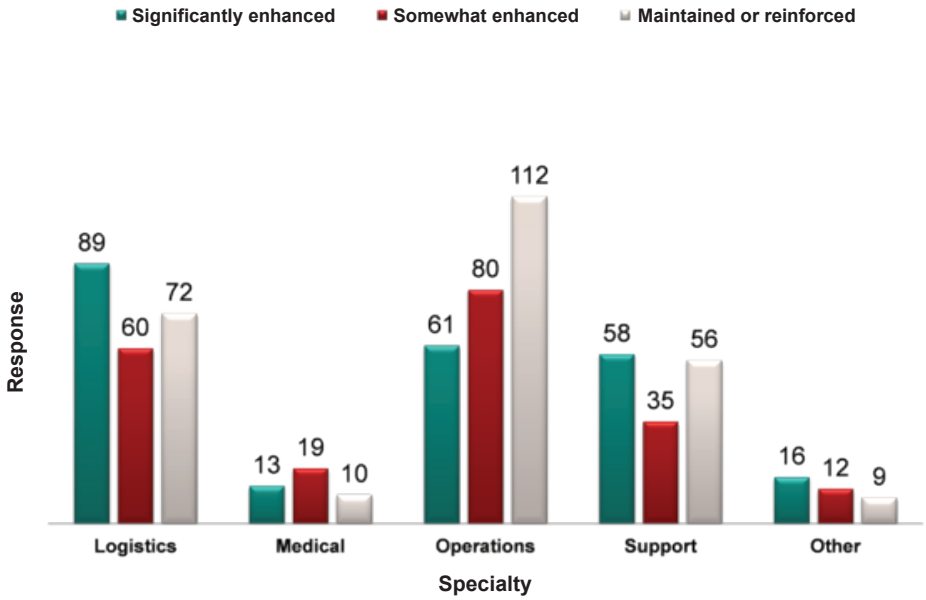
Figure A.13
The Effect That Building Partnerships and Partner Capacity Can Have on the Ability to Work Effectively with Partner Countries



NOTE: The survey item read, "What effect has your participation had on your ability to work effectively with host-/partner-nation personnel of other cultures and languages?"

RAND *TR1241-A.13*

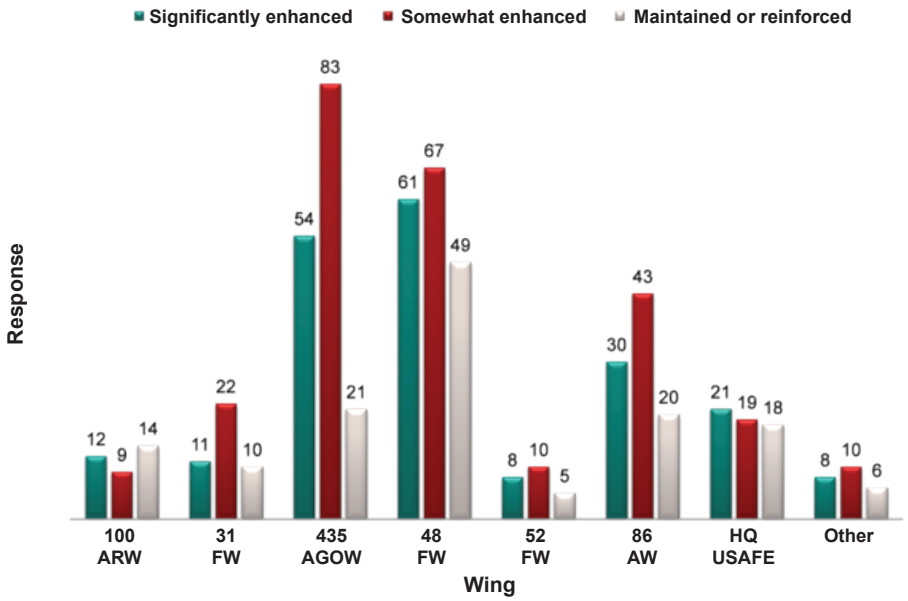
Figure A.14
The Effect That Building Partnerships and Partner Capacity Can Have on the Ability to Work Effectively with Partner Countries, by Specialty



NOTE: The survey item read, "What effect has your participation had on your ability to work effectively with host-/partner-nation personnel of other cultures and languages?"

RAND *TR1241-A.14*

Figure A.15
The Effect That Building Partnerships and Partner Capacity Can Have on the Ability to Work Effectively with Partner Countries, by Wing



NOTE: The survey item read, "What effect has your participation had on your ability to work effectively with host-/partner-nation personnel of other cultures and languages?"

RAND *TR1241-A.15*

7. On average, how often do you communicate informally (i.e., not in the context of a planned BP/BPC event involving you or your unit) with host-/partner-country military personnel? (See Figures A.16–A.18.)

___Never

___Less than once a year

___Once a year

___Once every 6 months

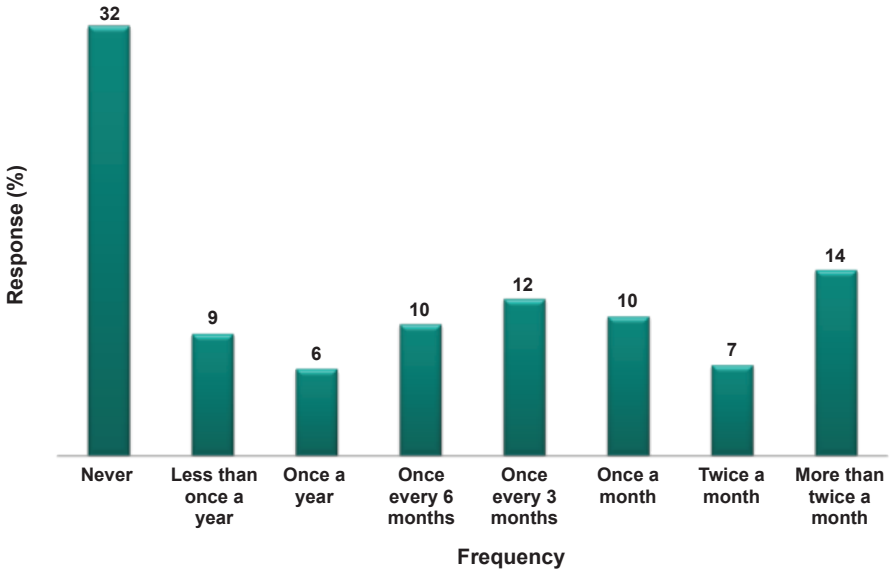
___Once every 3 months

___Once a month

___Twice a month

___More than twice a month (please specify)

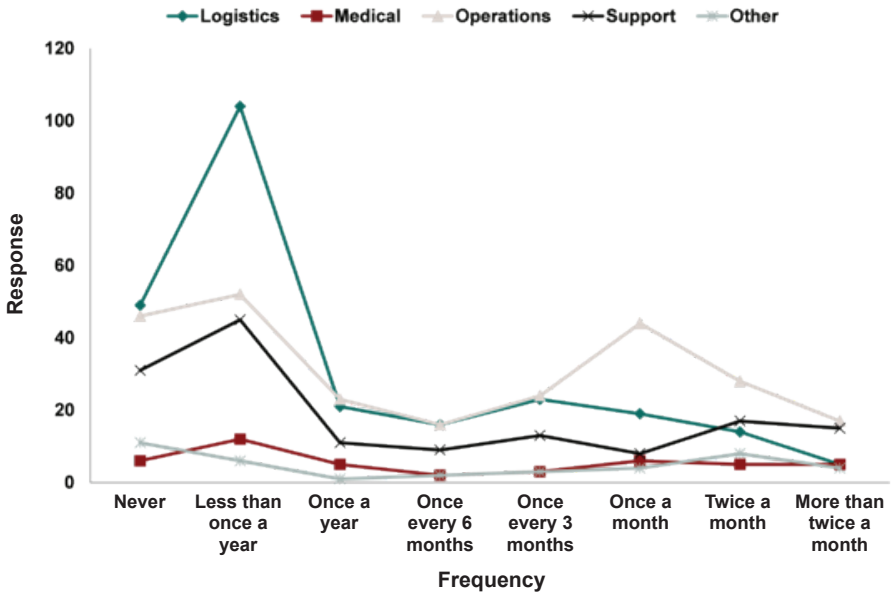
Figure A.16
Frequency of Informal Communication with Partner Military Personnel



NOTE: The survey item read, "On average, how often do you communicate informally (i.e., not in the context of a planned BP/BPC event involving you or your unit) with host-/partner-nation military personnel?"

RAND *TR1241-A.16*

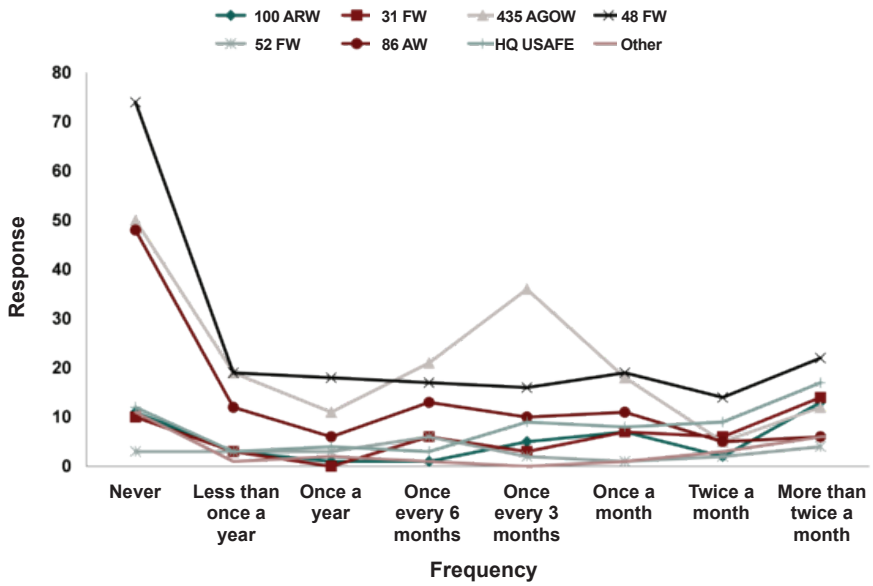
Figure A.17
Frequency of Informal Communication with Partner Military Personnel, by Specialty



NOTE: The survey item read, "On average, how often do you communicate informally (i.e., not in the context of a planned BP/BPC event involving you or your unit) with host-/partner-nation military personnel?"

RAND *TR1241-A.17*

Figure A.18
Frequency of Informal Communication with Partner Military Personnel, by Wing



NOTE: The survey item read, "On average, how often do you communicate informally (i.e., not in the context of a planned BP/BPC event involving you or your unit) with host-/partner-nation military personnel?"

RAND *TR1241-A.18*

8. About what percentage of your informal communication with host-/partner-country personnel is carried on through the following channels? (See Figures A.19–A.21.)

___Telephone

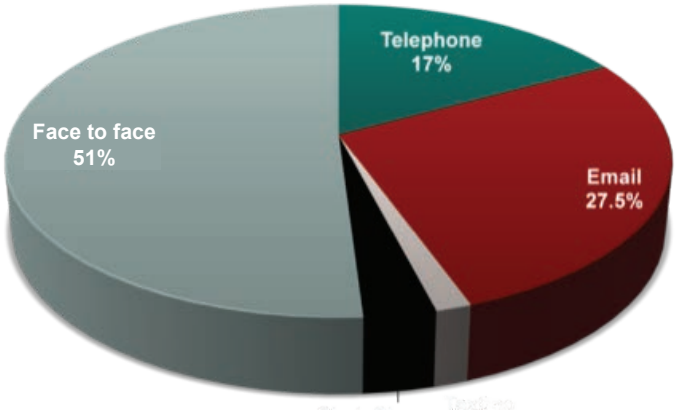
___Email

___Texting

___Internet (e.g., chat, Skype)

___Face to face

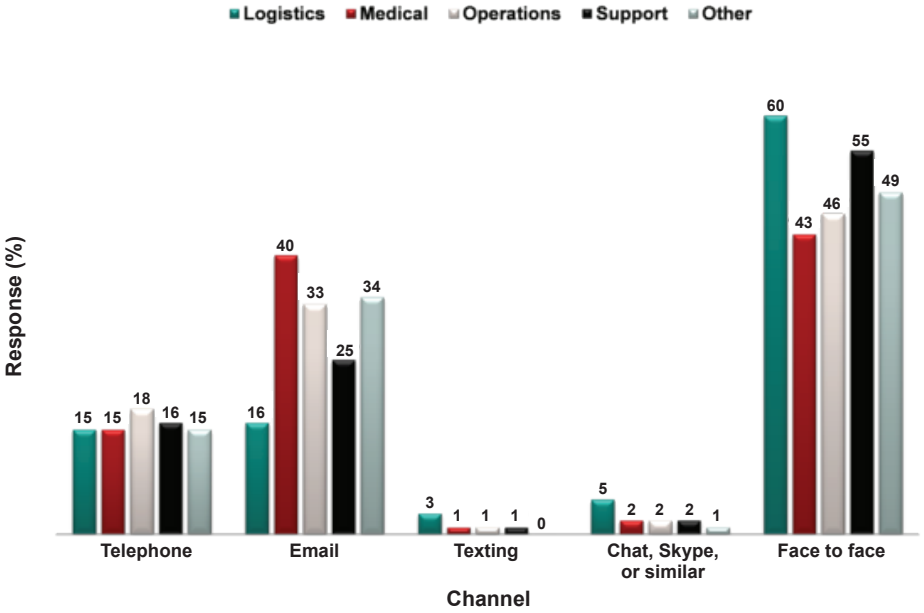
Figure A.19
Means of Informal Communication with Partners



NOTE: The survey item read, "About what percentage of your informal communication with host-/partner-nation personnel is carried on through the following channels?"

RAND *TR1241-A.19*

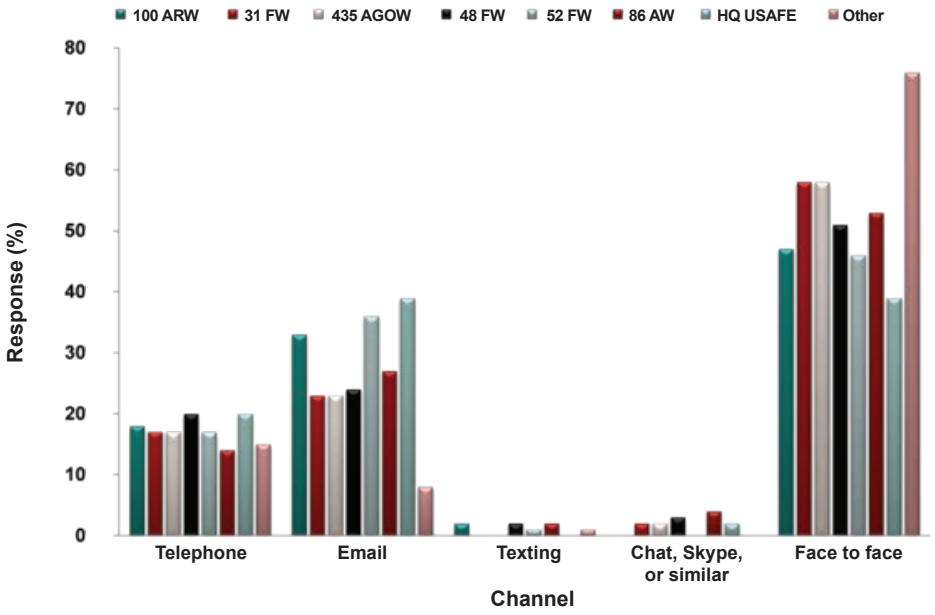
Figure A.20
Means of Informal Communication with Partners, by Specialty



NOTE: The survey item read, "About what percentage of your informal communication with host-/partner-nation personnel is carried on through the following channels?"

RAND *TR1241-A.20*

Figure A.21
Means of Informal Communication with Partners, by Wing



NOTE: The survey item read, "About what percentage of your informal communication with host-/partner-nation personnel is carried on through the following channels?"

RAND *TR1241-A.21*

9. About what percentage of your informal communication with host-/partner-country personnel is dedicated to the following? (See Figure A.22–A.24.)

___Discussing/resolving technical issues (e.g., maintenance problem on partner aircraft)

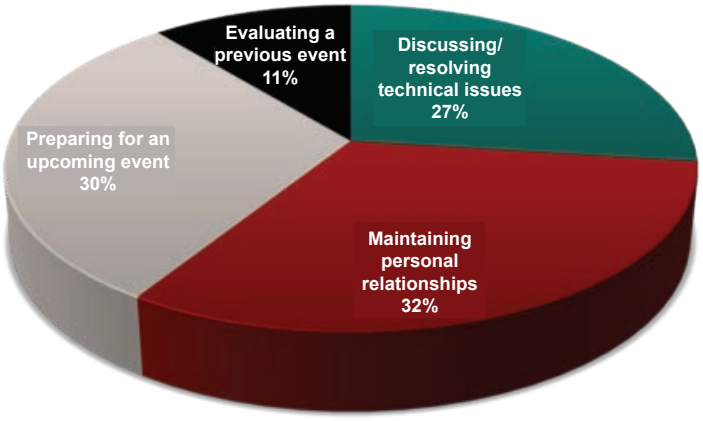
___Maintaining personal relationship (e.g., small talk, discussing family)

___Preparing for upcoming U.S. event with the partner military

___Evaluating a previous event with the partner military

___Other (please specify)

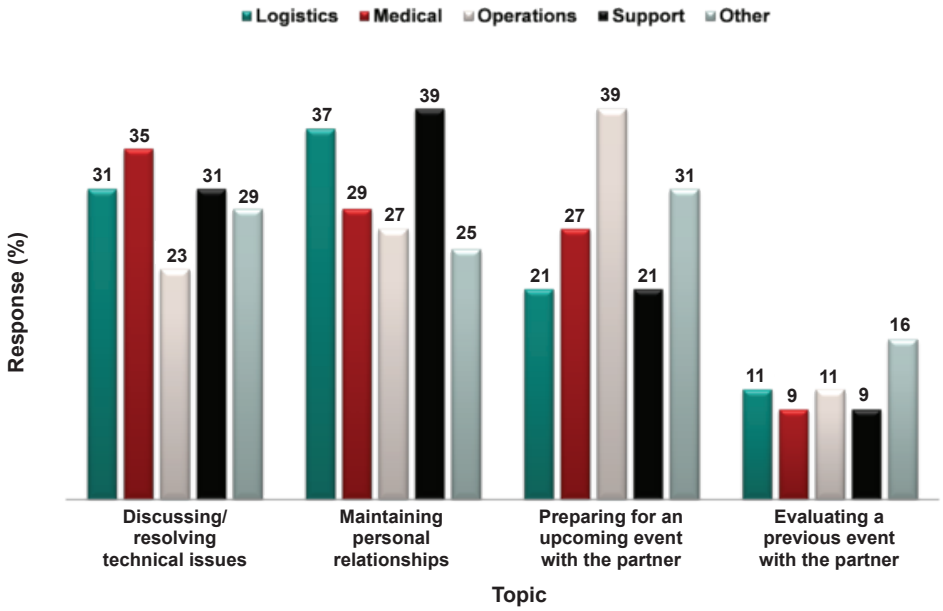
Figure A.22
Purpose of Informal Communication with Partners



NOTE: The survey item read, "About what percentage of your informal communication with host-/partner-nation personnel is dedicated to the following topics?"

RAND *TR1241-A.22*

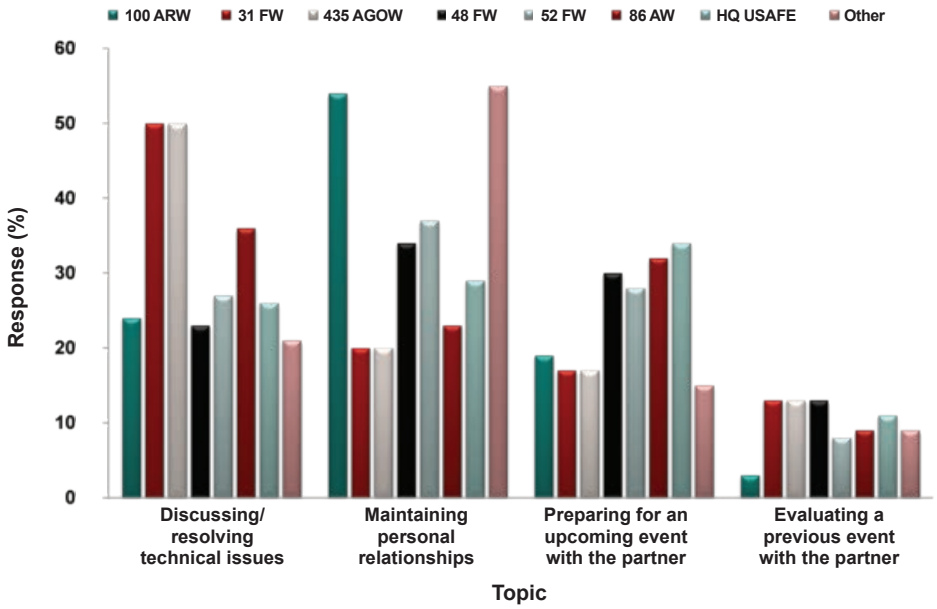
Figure A.23
Purpose of Informal Communication with Partners, by Specialty



NOTE: The survey item read, "About what percentage of your informal communication with host-/partner-nation personnel is carried on through the following topics?"

RAND *TR1241-A.23*

Figure A.24
Purpose of Informal Communication with Partners, by Wing



NOTE: The survey item read, "About what percentage of your informal communication with host-/partner-nation personnel is dedicated to the following topics?"

RAND *TR1241-A.24*

10. At times, currency and upgrade training is conducted off home station in foreign countries. Generally, how would you describe the effect on learning, currency, and unit readiness of conducting training off station in foreign countries? (See Figures A.25–A.27.)

___Very beneficial to learning, currency, and readiness

___Somewhat beneficial to learning, currency, and readiness

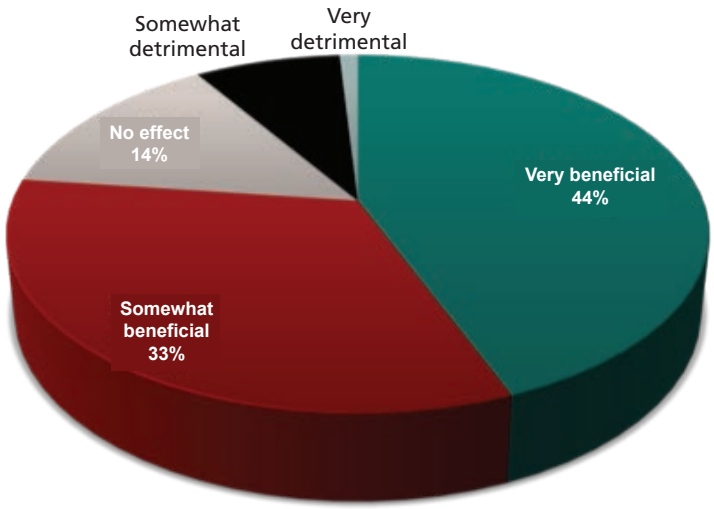
___Does not affect learning, currency, or readiness

___Somewhat detrimental to learning, currency, and readiness

___Very detrimental to learning, currency, and readiness

Comments?

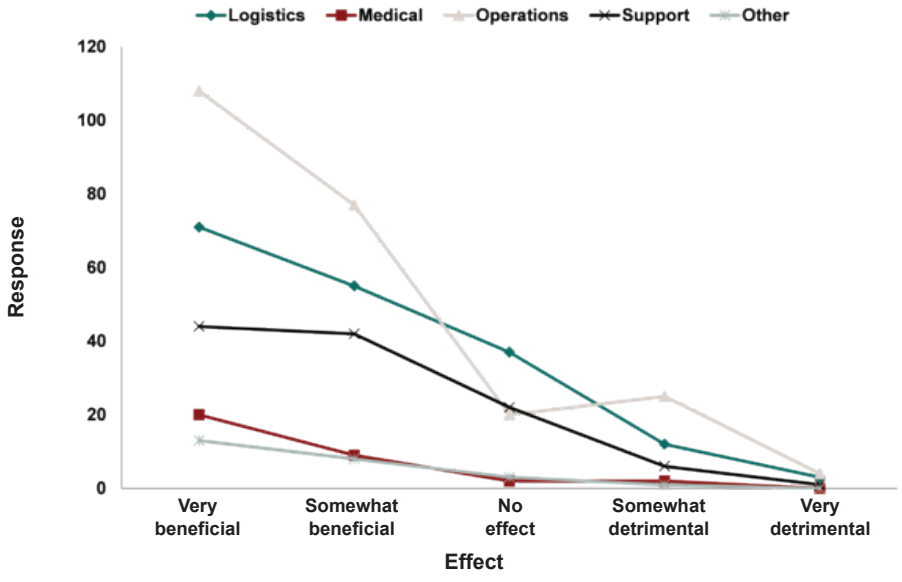
Figure A.25
Off-Station Training's Effect on Learning, Currency, and Readiness



NOTE: The survey item read, "At times, currency and upgrade training is conducted off home station in foreign nations. Generally, how would you describe the effect on learning, currency, and unit readiness of conducting training off station in foreign nations?"

RAND *TR1241-A.25*

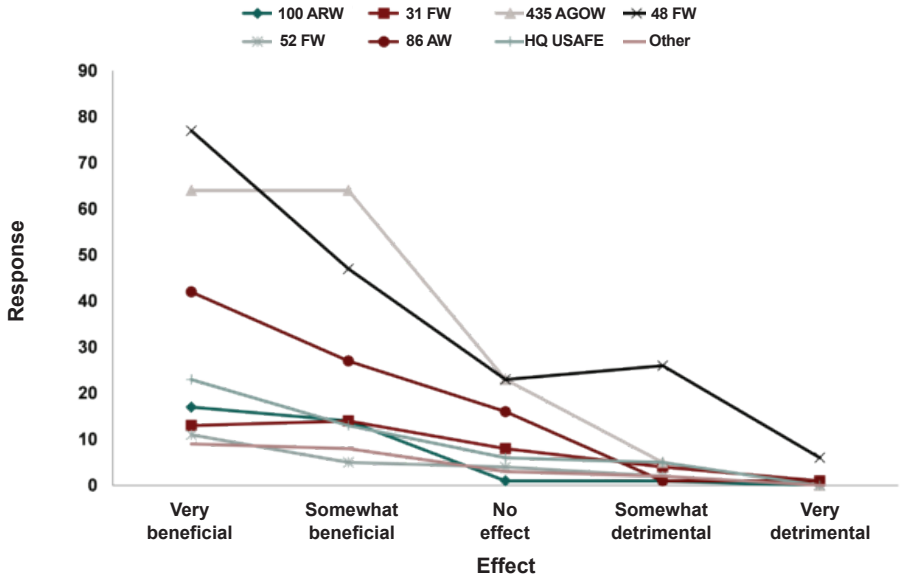
Figure A.26
Off-Station Training's Effect on Learning, Currency, and Readiness, by Specialty



NOTE: The survey item read, "At times, currency and upgrade training is conducted off home station in foreign nations. Generally, how would you describe the effect on learning, currency, and unit readiness of conducting training off station in foreign nations?"

RAND *TR1241-A.26*

Figure A.27
Off-Station Training's Effect on Learning, Currency, and Readiness, by Wing



NOTE: The survey item read, "At times, currency and upgrade training is conducted off home station in foreign nations. Generally, how would you describe the effect on learning, currency, and unit readiness of conducting training off station in foreign nations?"

RAND *TR1241-A.27*

11. When you do off-station training, how often do you take the opportunity to interact, share information, and establish relationships with host-/partner-country military personnel? In other words, how frequently do you impart "ancillary benefit" to the partner by conducting BP/BPC activities while you are present for training? (See Figures A.28–A.30.)

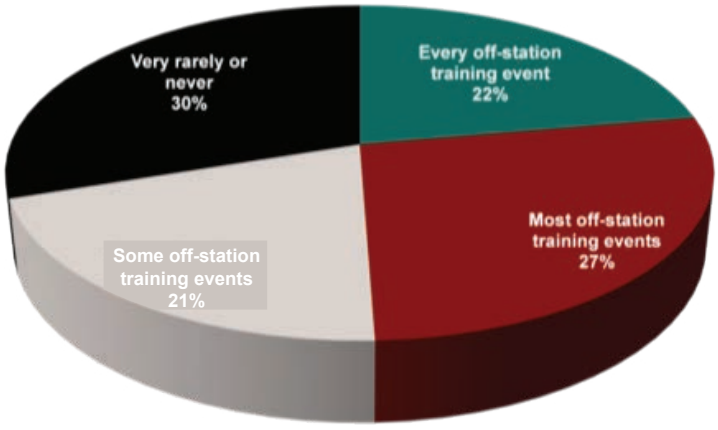
___Every training event conducted off station

___Most training events conducted off station

___Some training events conducted off station

___Very rarely or never on training events conducted off station

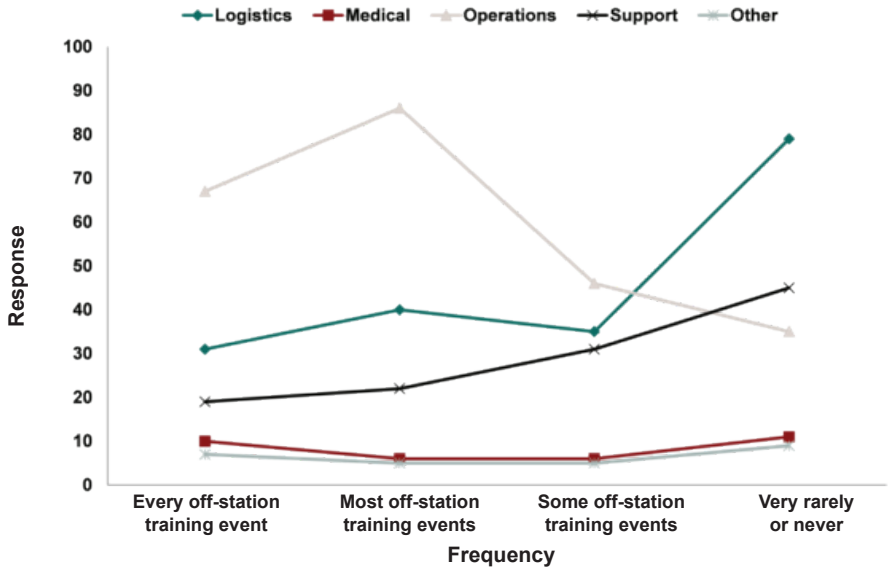
Figure A.28
Frequency of Building Partnerships and Partner Capacity During Off-Station Training (ancillary benefits)



NOTE: The survey item read, "When you do off-station training, how often do you take the opportunity to interact, share information, and establish relationships with host-/partner-nation military personnel? In other words, how frequently do you impart 'ancillary benefit' to the partner by conducting BP/BPC activities while you are present for training?"

RAND *TR1241-A.28*

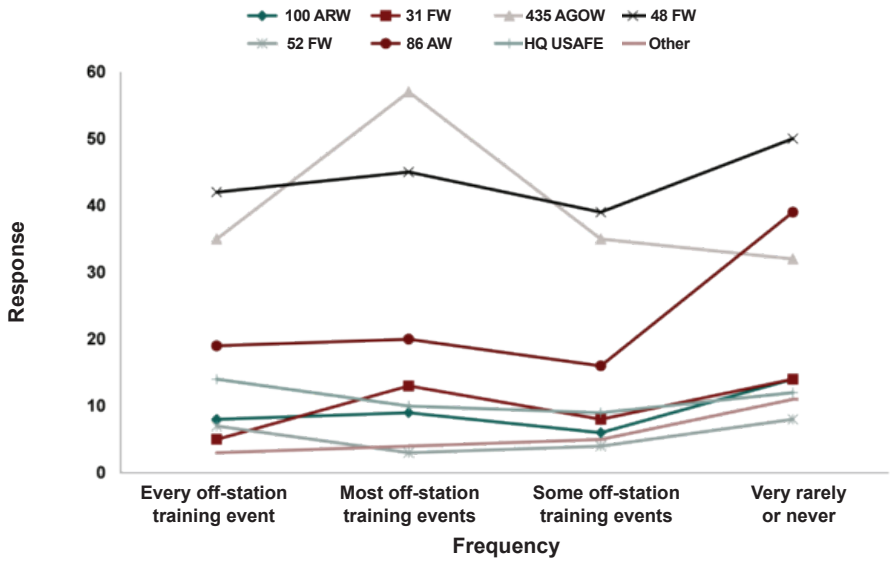
Figure A.29
Frequency of Building Partnerships and Partner Capacity During Off-Station Training (ancillary benefits), by Specialty



NOTE: The survey item read, "When you do off-station training, how often do you take the opportunity to interact, share information, and establish relationships with host-/partner-nation military personnel? In other words, how frequently do you impart 'ancillary benefit' to the partner by conducting BP/BPC activities while you are present for training?"

RAND *TR1241-A.29*

Figure A.30
Frequency of Building Partnerships and Partner Capacity During Off-Station Training (ancillary benefits), by Wing



NOTE: The survey item read, "When you do off-station training, how often do you take the opportunity to interact, share information, and establish relationships with host-/partner-nation military personnel? In other words, how frequently do you impart 'ancillary benefit' to the partner by conducting BP/BPC activities while you are present for training?"

RAND *TR1241-A.30*

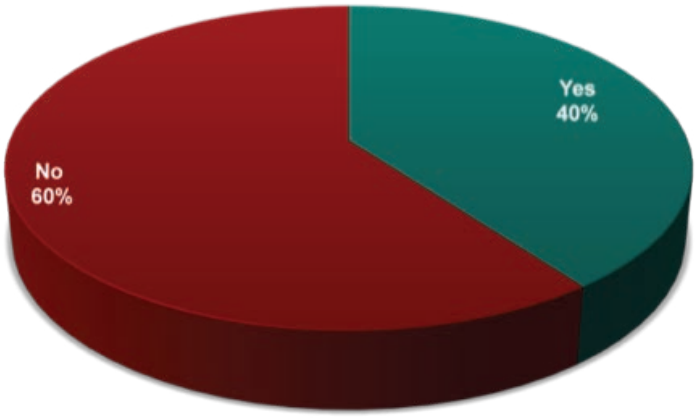
Questions 12 and 13 are aimed at operational units; they are less relevant to HQ staff. If you are a member of the HQ staff, you may decide to answer these questions based on previous experience or skip to Question 14.

12. Does your unit or division have "go-to" personnel (in any career field) who are tasked more frequently than others to conduct BP/BPC events with foreign partners? (See Figures A.31–A.33.)

___Yes, the same "go-to" personnel seem to be tasked to do BP/BPC events

___No, taskings for BP/BPC events are generally spread across the unit

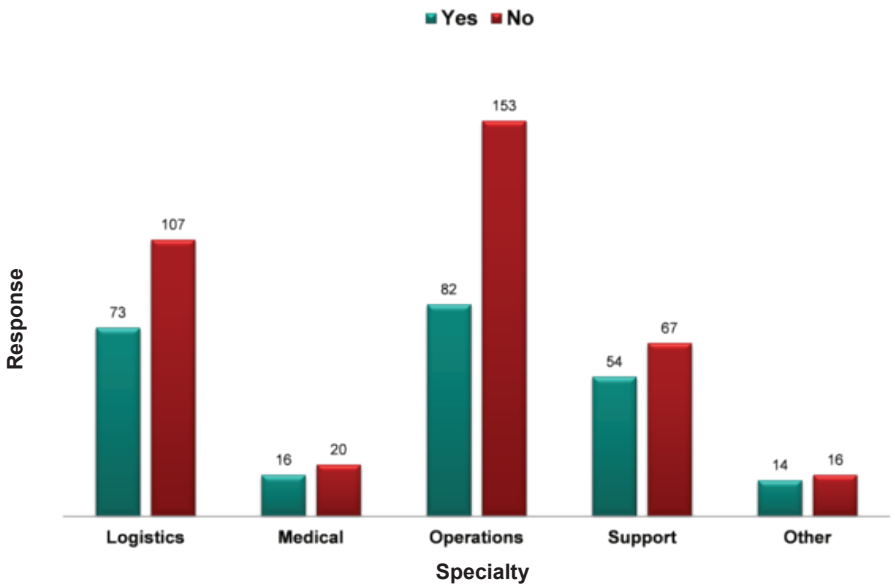
Figure A.31
Presence of Go-To Personnel Tasked More Frequently for Building Partnerships and Partner Capacity



NOTE: The survey item read, "Does your unit or division have 'go-to' personnel (in any career field) who are tasked more frequently than others to conduct BP/BPC events with foreign partners?"

RAND *TR1241-A.31*

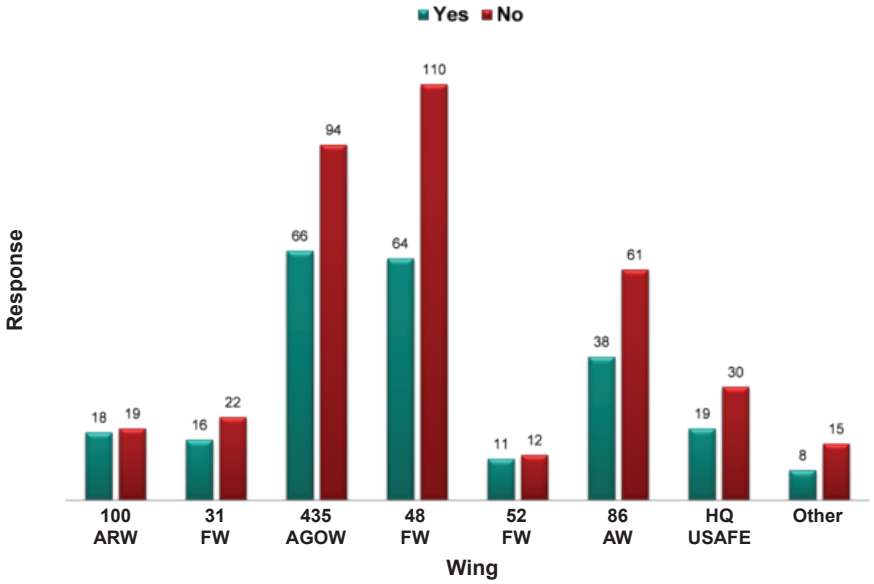
Figure A.32
Presence of Go-To Personnel Tasked More Frequently for Building Partnerships and Partner Capacity, by Specialty



NOTE: The survey item read, "Does your unit or division have 'go-to' personnel (in any career field) who are tasked more frequently than others to conduct BP/BPC events with foreign partners?"

RAND *TR1241-A.32*

Figure A.33
Presence of Go-To Personnel Tasked More Frequently for Building Partnerships and Partner Capacity, by Wing



NOTE: The survey item read, "Does your unit or division have 'go-to' personnel (in any career field) who are tasked more frequently than others to conduct BP/BPC events with foreign partners?"

RAND *TR1241-A.33*

13. If yes, why do you think this is? (See Figures A.34–A.36.)

___Seniority

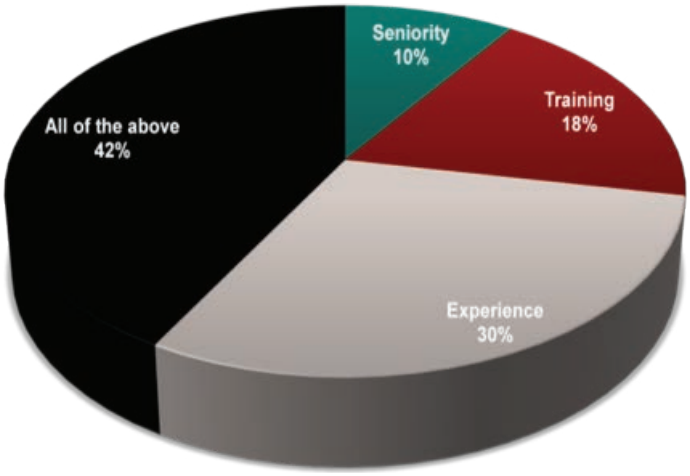
___Training (including advisory training)

___Experience

___All of the above

___Other (please specify)

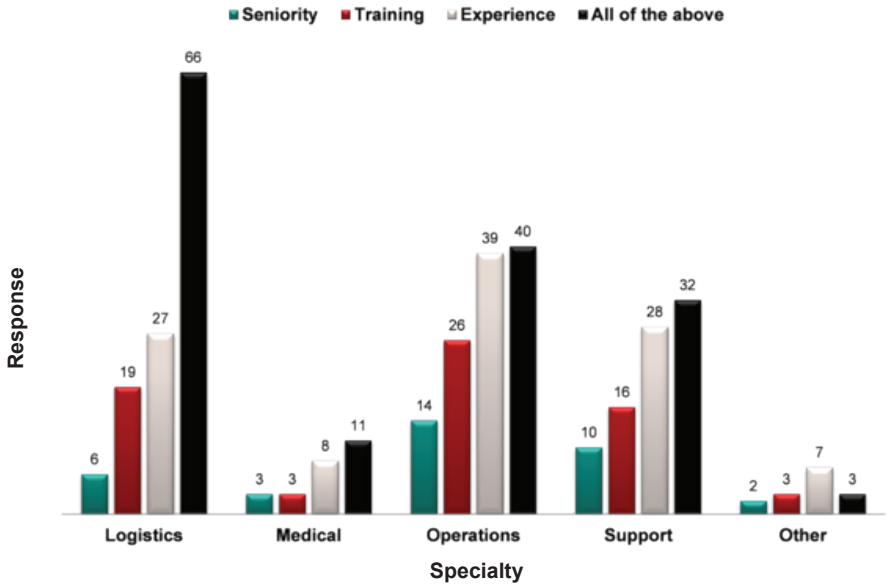
Figure A.34
Rationale for Tasking Go-To Personnel for Events to Build Partnerships and Partner Capacity



NOTE: The survey item read, "Does your unit or division have 'go-to' personnel (in any career field) who are tasked more frequently than others to conduct BP/BPC events with foreign partners? If so, why do you think this is?"

RAND *TR1241-A.34*

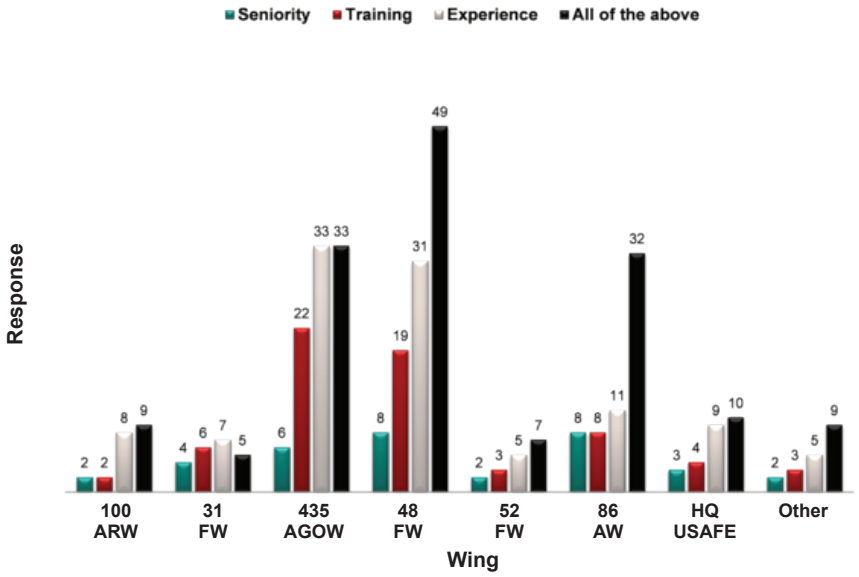
Figure A.35
Rationale for Tasking Go-To Personnel for Events to Build Partnerships and Partner Capacity, by Specialty



NOTE: The survey item read, "Does your unit or division have 'go-to' personnel (in any career field) who are tasked more frequently than others to conduct BP/BPC events with foreign partners? If so, why do you think this is?"

RAND *TR1241-A.35*

Figure A.36
Rationale for Tasking Go-To Personnel for Events to Build Partnerships and Partner Capacity, by Wing



NOTE: The survey item read, "Does your unit or division have 'go-to' personnel (in any career field) who are tasked more frequently than others to conduct BP/BPC events with foreign partners? If so, why do you think this is?"

RAND *TR1241-A.36*

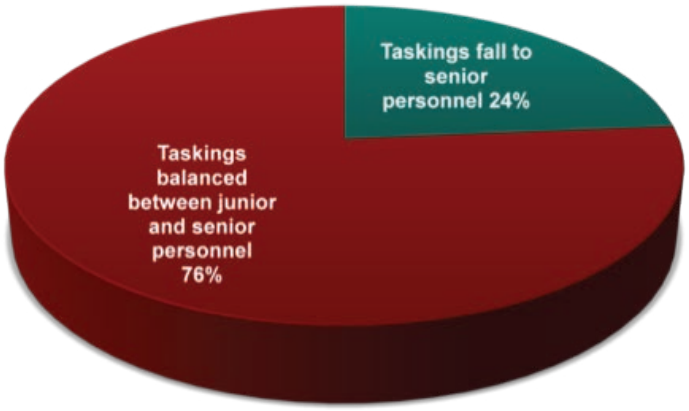
14. Do the more-senior personnel in your division often get tasked for BP/BPC events with foreign partners, or is it often a fair mix of junior and senior personnel? (See Figures A.37–A.39.)

___Taskings to participate in events often fall to senior personnel

___Taskings to participate in events often are balanced between junior and senior personnel

___It depends (please explain)

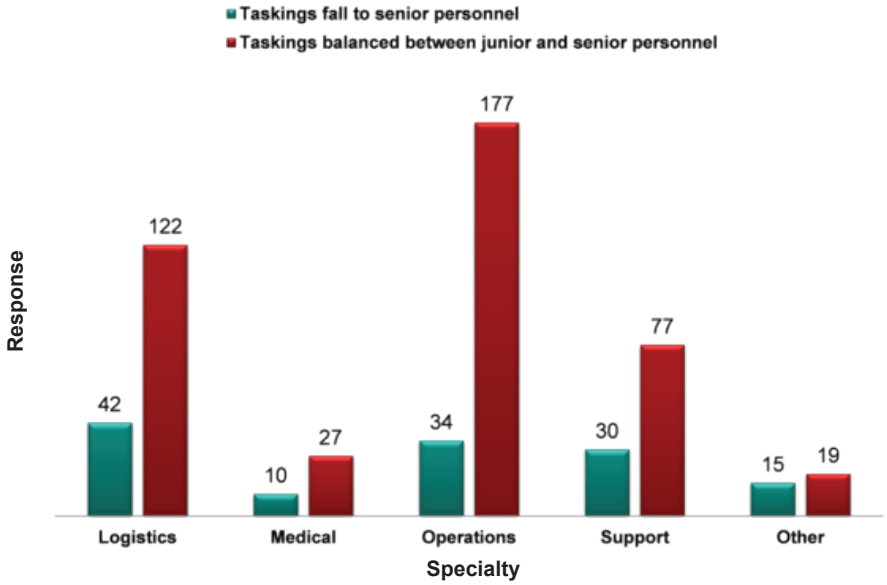
Figure A.37
Balance of Taskings for Building Partnerships



NOTE: The survey item read, "Do the more-senior personnel in your division often get tasked for BP/BPC events with foreign partners, or is it often a fair mix of junior and senior personnel?"

RAND *TR1241-A.37*

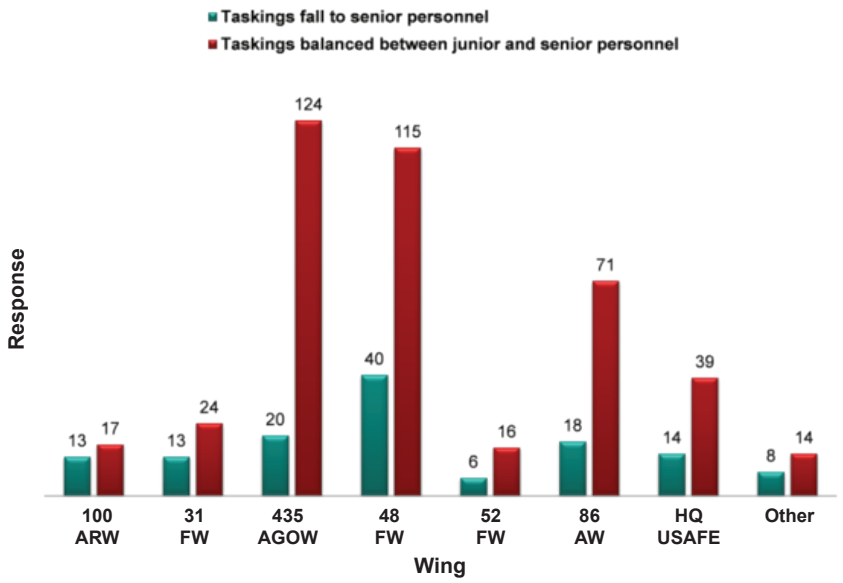
Figure A.38
Balance of Taskings for Building Partnerships, by Specialty



NOTE: The survey item read, "Do the more-senior personnel in your division often get tasked for BP/BPC events with foreign partners, or is it often a fair mix of junior and senior personnel?"

RAND *TR1241-A.38*

Figure A.39
Balance of Taskings for Building Partnerships, by Wing



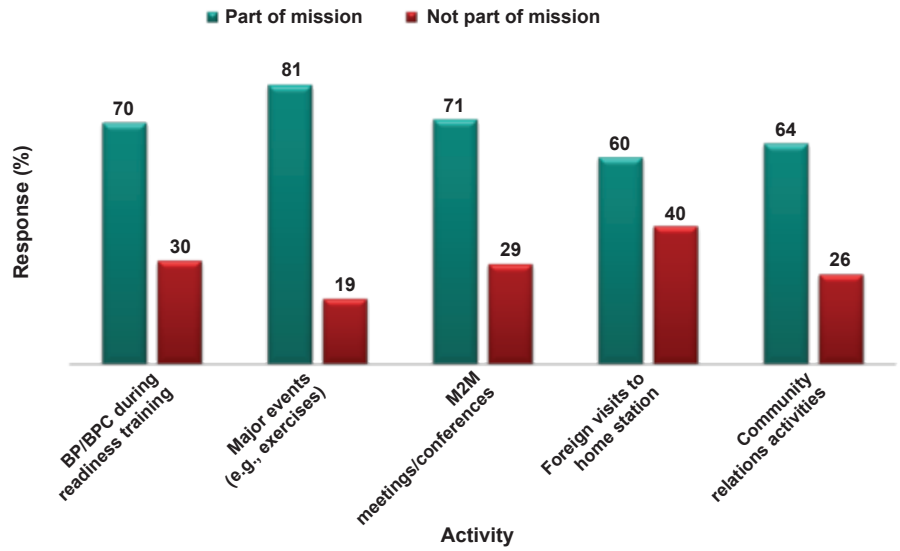
NOTE: The survey item read, "Do the more-senior personnel in your division often get tasked for BP/BPC events with foreign partners, or is it often a fair mix of junior and senior personnel?"

RAND *TR1241-A.39*

15. Do you feel that participation in BP/BPC activities is part of your unit's or division's primary mission or not part of that primary mission? Please select one for each type of event. *Community relations activities* includes air shows and community events involving local citizens. (See Figures A.40–A.50.)

	Part of Mission	Not Part of Mission
BP/BPC during readiness training		
Major events (e.g., exercises)		
M2M meetings or conferences		
Foreign visits to home station		
Community relations activities		

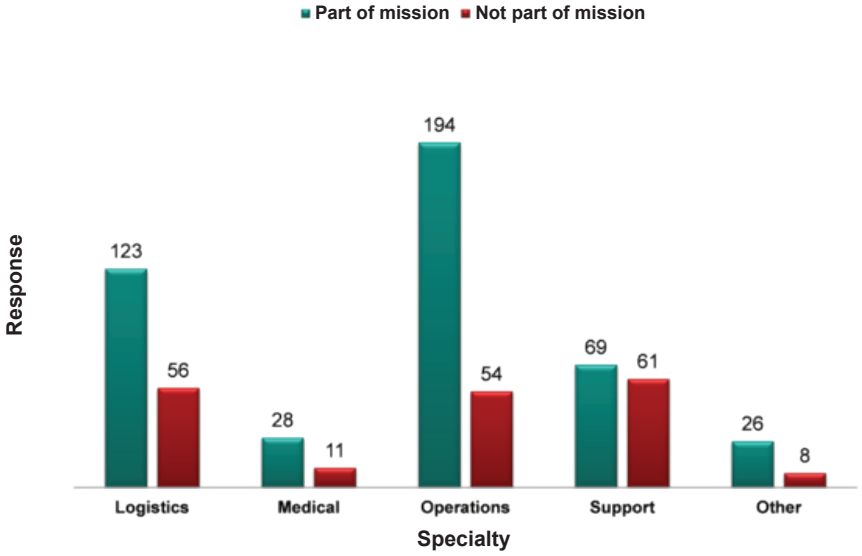
Figure A.40
Relevance of Activities for Building Partnerships and Partner Capacity to Unit's Primary Mission



NOTE: The survey item read, "Do you feel that participation in BP/BPC activities is part of your unit's or division's primary mission or not part of that primary mission? Please select one for each type of event. *Community relations activities* includes air shows and community events involving local citizens."

RAND *TR1241-A.40*

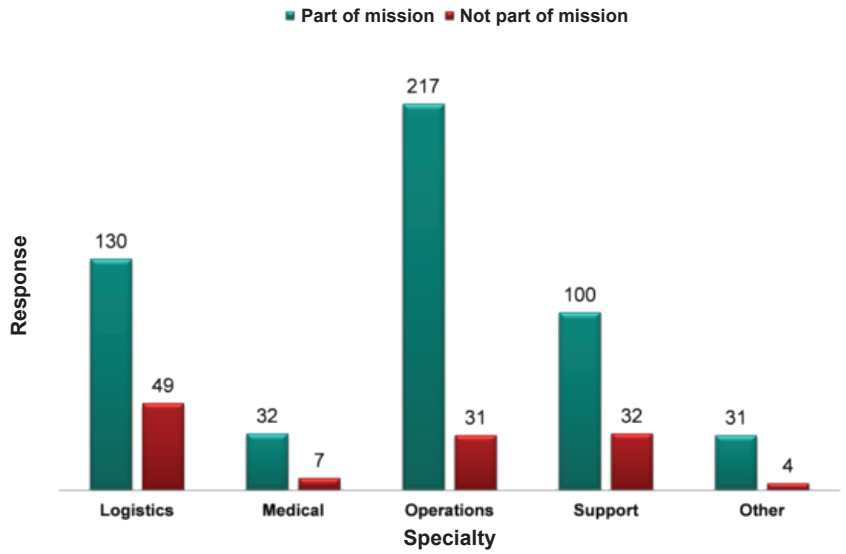
Figure A.41
Relevance of Building Partnerships and Partner Capacity During Readiness Training to Unit's Primary Mission, by Specialty



NOTE: The survey item read, "Do you feel that participation in BP/BPC activities is part of your unit's or division's primary mission or not part of that primary mission? Please select one for each type of event. *Community relations activities* includes air shows and community events involving local citizens."

RAND *TR1241-A.41*

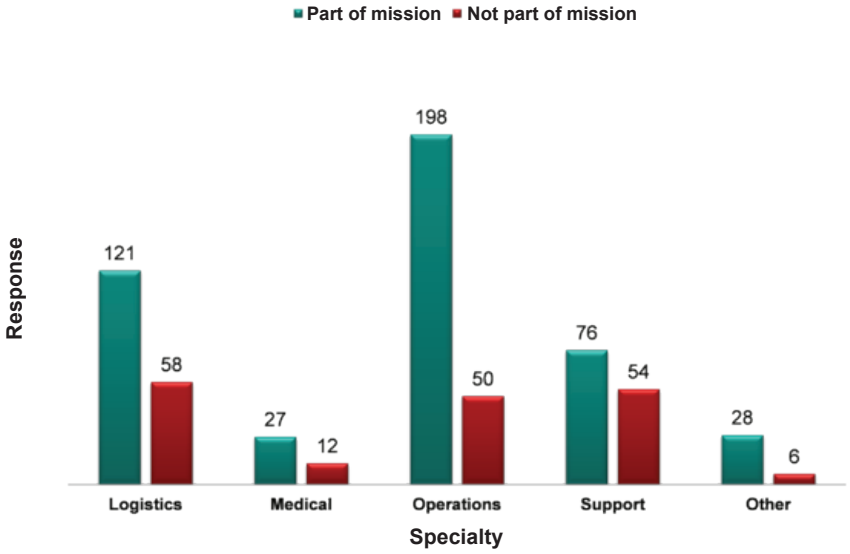
Figure A.42
Relevance of Major Events (e.g., exercises) to Unit's Primary Mission, by Specialty



NOTE: The survey item read, "Do you feel that participation in BP/BPC activities is part of your unit's or division's primary mission or not part of that primary mission? Please select one for each type of event. *Community relations activities* includes air shows and community events involving local citizens."

RAND *TR1241-A.42*

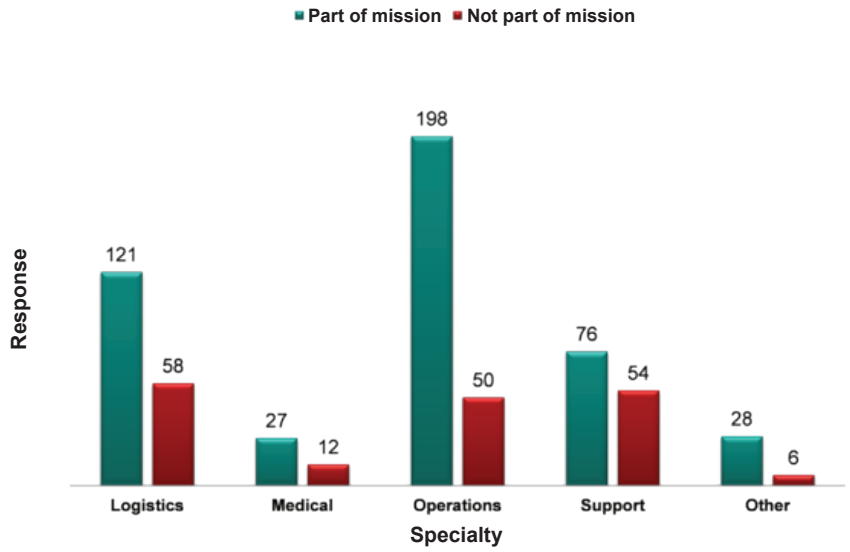
Figure A.43
Relevance of Military-to-Military Meetings and Conferences to Unit's Primary Mission, by Specialty



NOTE: The survey item read, "Do you feel that participation in BP/BPC activities is part of your unit's or division's primary mission or not part of that primary mission? Please select one for each type of event. *Community relations activities* includes air shows and community events involving local citizens."

RAND *TR1241-A.43*

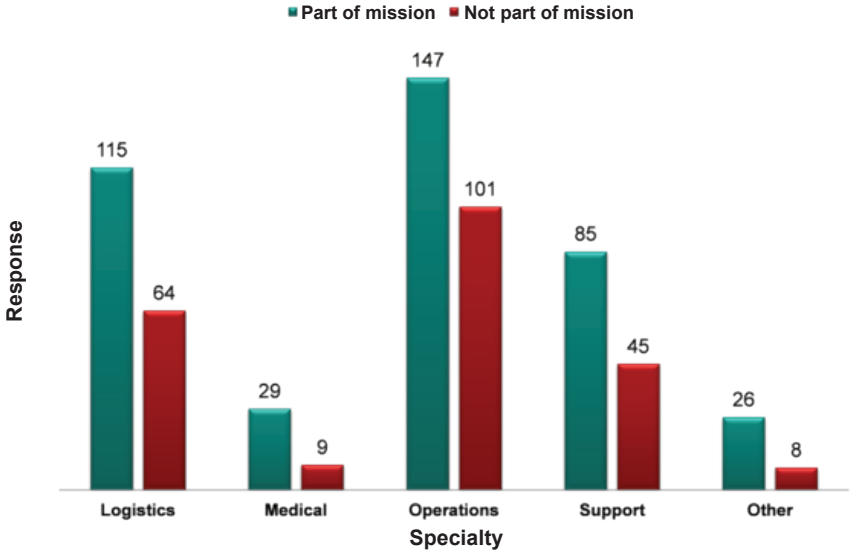
Figure A.44
Relevance of Foreign Visits to Home Station to Unit's Primary Mission, by Specialty



NOTE: The survey item read, "Do you feel that participation in BP/BPC activities is part of your unit's or division's primary mission or not part of that primary mission? Please select one for each type of event. *Community relations activities* includes air shows and community events involving local citizens."

RAND *TR1241-A.44*

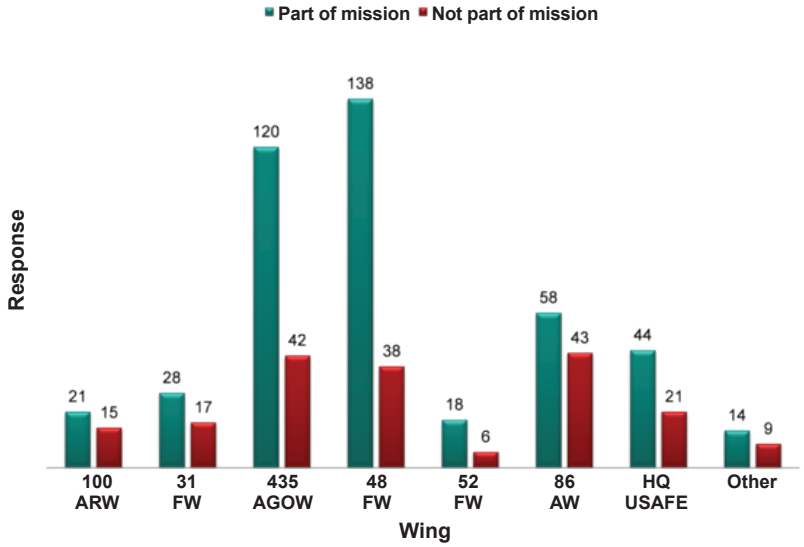
Figure A.45
Relevance of Community Relations Activities to Unit's Primary Mission, by Specialty



NOTE: The survey item read, "Do you feel that participation in BP/BPC activities is part of your unit's or division's primary mission or not part of that primary mission? Please select one for each type of event. *Community relations activities* includes air shows and community events involving local citizens."

RAND *TR1241-A.45*

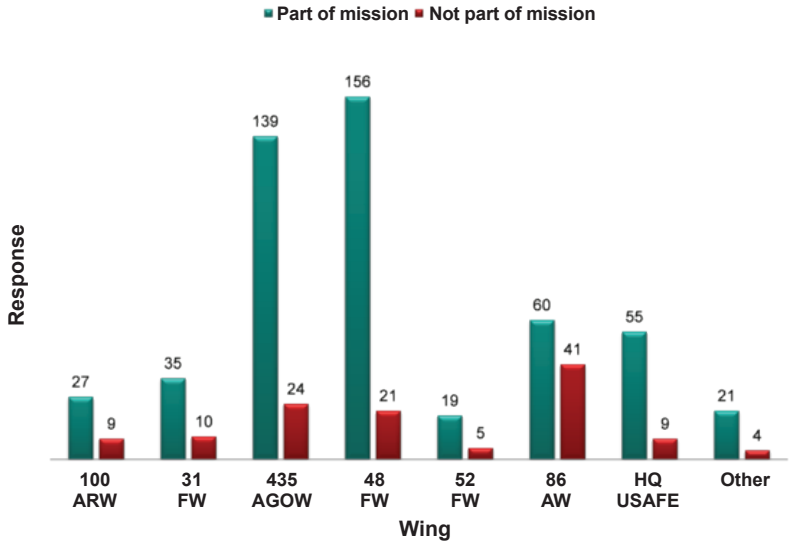
Figure A.46
Relevance of Building Partnerships and Partner Capacity During Readiness Training to Unit's Primary Mission, by Wing



NOTE: The survey item read, "Do you feel that participation in BP/BPC activities is part of your unit's or division's primary mission or not part of that primary mission? Please select one for each type of event. *Community relations activities* includes air shows and community events involving local citizens."

RAND *TR1241-A.46*

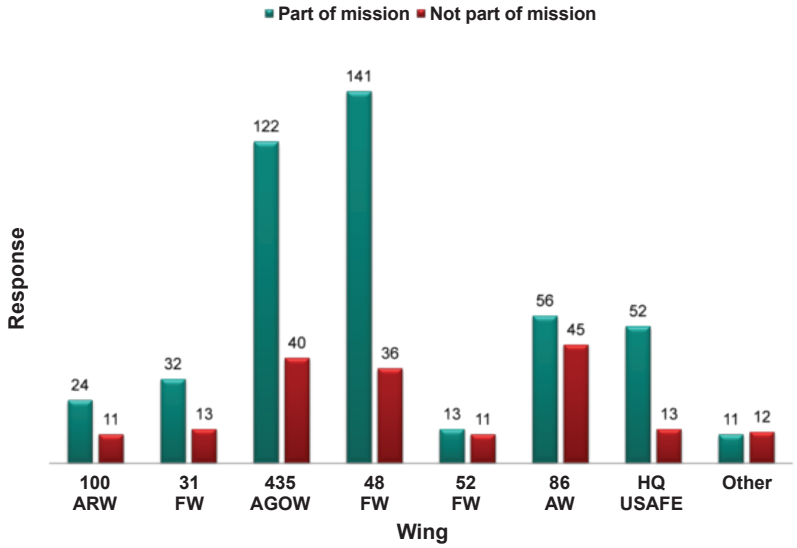
Figure A.47
Relevance of Major Events (e.g., exercises) to Unit's Primary Mission, by Wing



NOTE: The survey item read, "Do you feel that participation in BP/BPC activities is part of your unit's or division's primary mission or not part of that primary mission? Please select one for each type of event. *Community relations activities* includes air shows and community events involving local citizens."

RAND *TR1241-A.47*

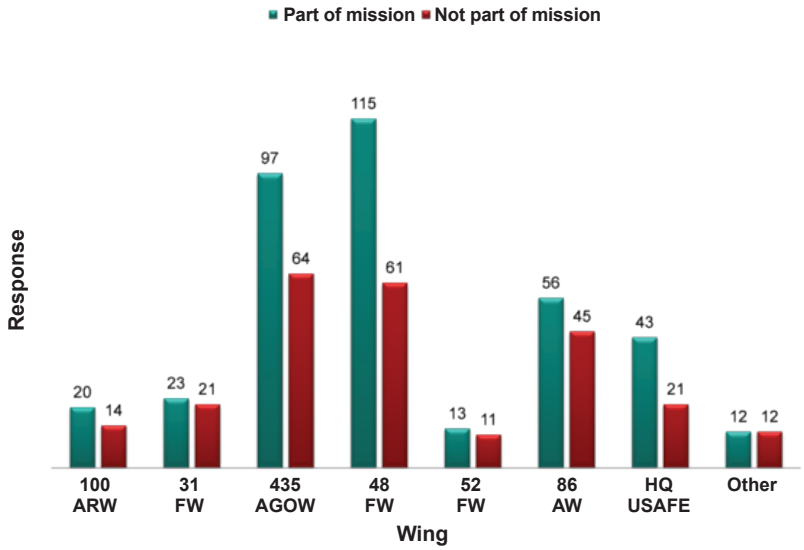
Figure A.48
Relevance of Military-to-Military Meetings and Conferences to Unit's Primary Mission, by Wing



NOTE: The survey item read, "Do you feel that participation in BP/BPC activities is part of your unit's or division's primary mission or not part of that primary mission? Please select one for each type of event. *Community relations activities* includes air shows and community events involving local citizens."

RAND *TR1241-A.48*

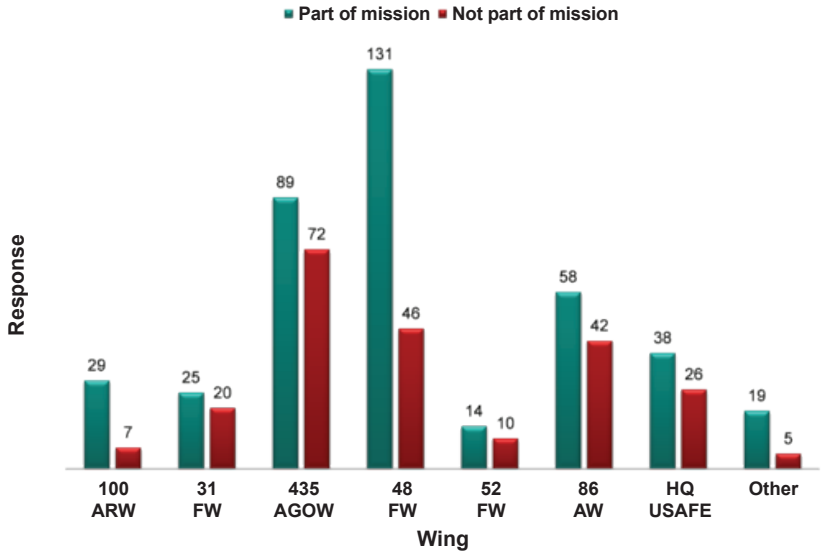
Figure A.49
Relevance of Foreign Visits to Home Station to Unit's Primary Mission, by Wing



NOTE: The survey item read, "Do you feel that participation in BP/BPC activities is part of your unit's or division's primary mission or not part of that primary mission? Please select one for each type of event. *Community relations activities* includes air shows and community events involving local citizens."

RAND *TR1241-A.49*

Figure A.50
Relevance of Community Relations Activities to Unit's Primary Mission, by Wing



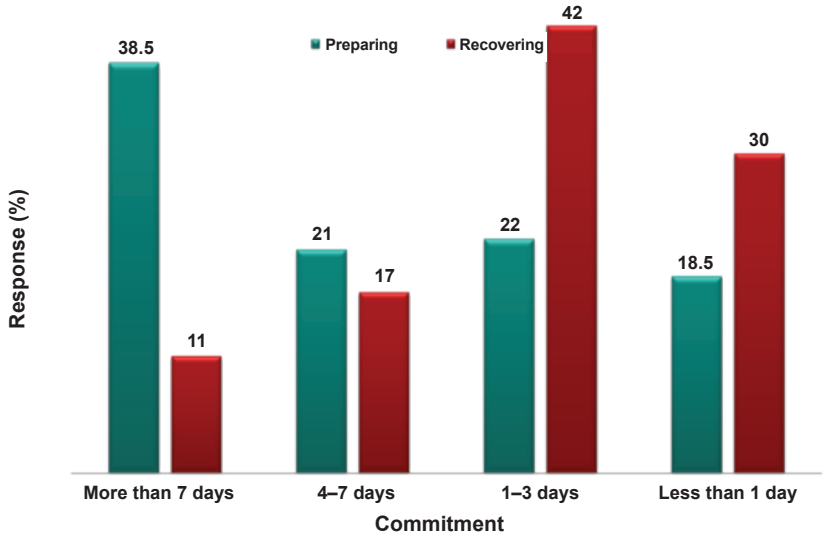
NOTE: The survey item read, "Do you feel that participation in BP/BPC activities is part of your unit's or division's primary mission or not part of that primary mission? Please select one for each type of event. *Community relations activities* includes air shows and community events involving local citizens."

RAND *TR1241-A.50*

16. When you are participating in a dedicated BP/BPC event (whether exercises, conferences, seminars, etc.), what is your approximate personal time commitment preparing for or recovering from an event? Please include paperwork, travel planning, preparatory communication with partner-country personnel, after-action reporting, postponing or making up training, etc. (See Figures A.51–A.55.)

	Preparing for an Event	Recovering from an Event
More than 7 days		
4–7 days		
1–3 days		
Less than 1 day		

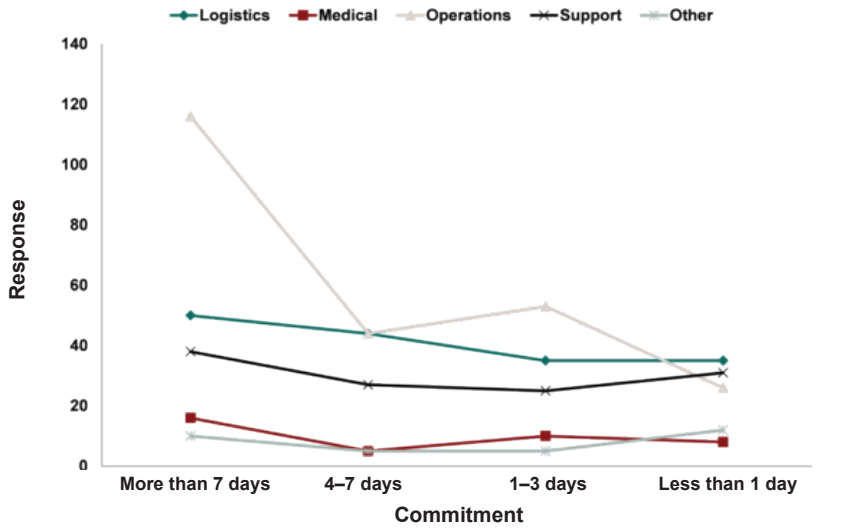
Figure A.51
Personal Time Commitment Preparing for or Recovering from Events for Building Partnerships and Partner Capacity



NOTE: The survey item read, "When you are participating in a dedicated BP/BPC event (whether exercises, conferences, seminars, or something else), what is your approximate personal time commitment preparing for or recovering from an event? Please include paperwork, travel planning, preparatory communication with partner-nation personnel, after-action reporting, postponing or making up training, and other activities."

RAND *TR1241-A.51*

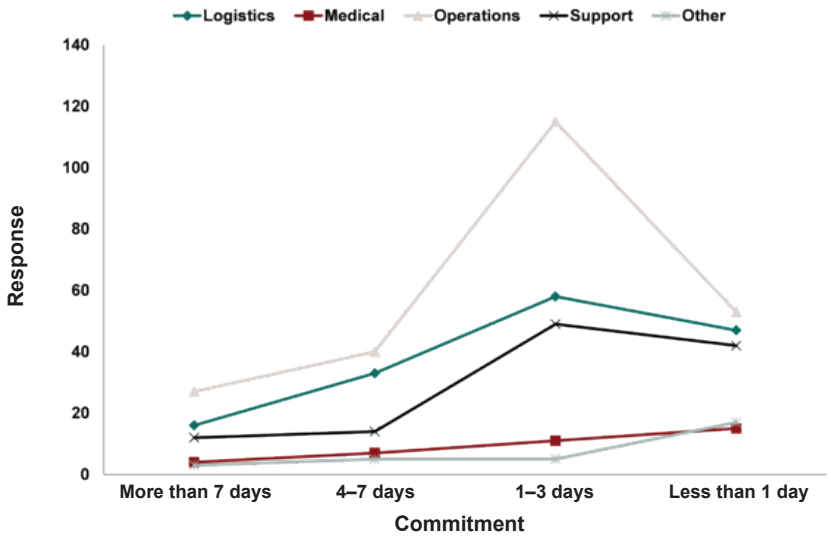
Figure A.52
Personal Time Commitment Preparing for Events for Building Partnerships and Partner Capacity, by Specialty



NOTE: The survey item read, "When you are participating in a dedicated BP/BPC event (whether exercises, conferences, seminars, or something else), what is your approximate personal time commitment preparing for or recovering from an event? Please include paperwork, travel planning, preparatory communication with partner-nation personnel, after-action reporting, postponing or making up training, and other activities."

RAND *TR1241-A.52*

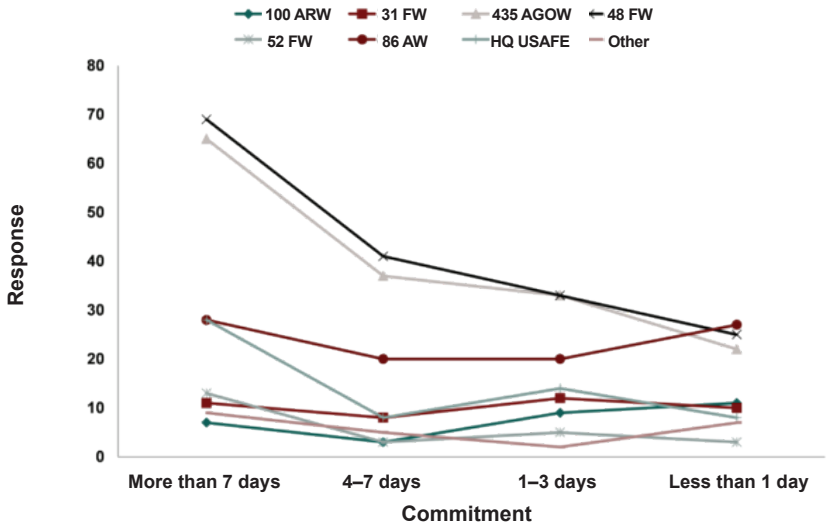
Figure A.53
Personal Time Commitment Recovering from Events for Building Partnerships and Partner Capacity, by Specialty



NOTE: The survey item read, "When you are participating in a dedicated BP/BPC event (whether exercises, conferences, seminars, or something else), what is your approximate personal time commitment preparing for or recovering from an event? Please include paperwork, travel planning, preparatory communication with partner-nation personnel, after-action reporting, postponing or making up training, and other activities."

RAND *TR1241-A.53*

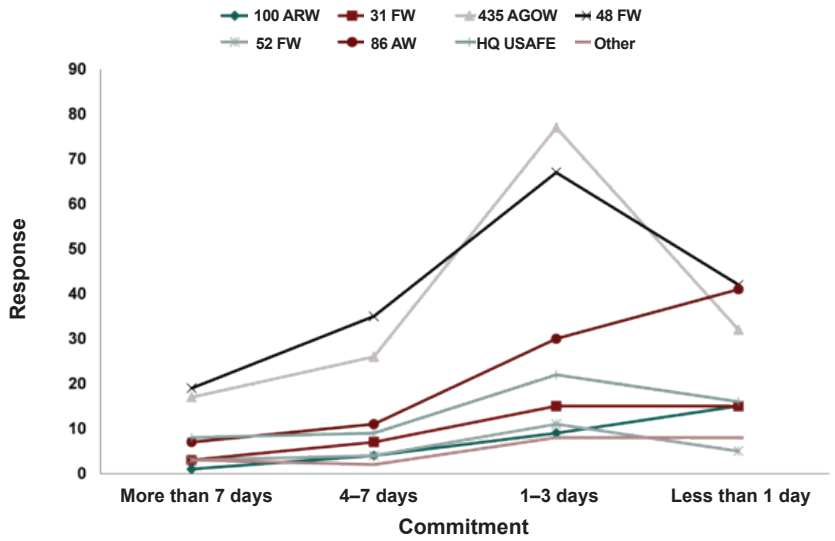
Figure A.54
Personal Time Commitment Preparing for Events for Building Partnerships and Partner Capacity, by Wing



NOTE: The survey item read, "When you are participating in a dedicated BP/BPC event (whether exercises, conferences, seminars, or something else), what is your approximate personal time commitment preparing for or recovering from an event? Please include paperwork, travel planning, preparatory communication with partner-nation personnel, after-action reporting, postponing or making up training, and other activities."

RAND *TR1241-A.54*

Figure A.55
Personal Time Commitment Recovering from Events for Building Partnerships and Partner Capacity, by Wing



NOTE: The survey item read, "When you are participating in a dedicated BP/BPC event (whether exercises, conferences, seminars, or something else), what is your approximate personal time commitment preparing for or recovering from an event? Please include paperwork, travel planning, preparatory communication with partner-nation personnel, after-action reporting, postponing or making up training, and other activities."

RAND *TR1241-A.55*

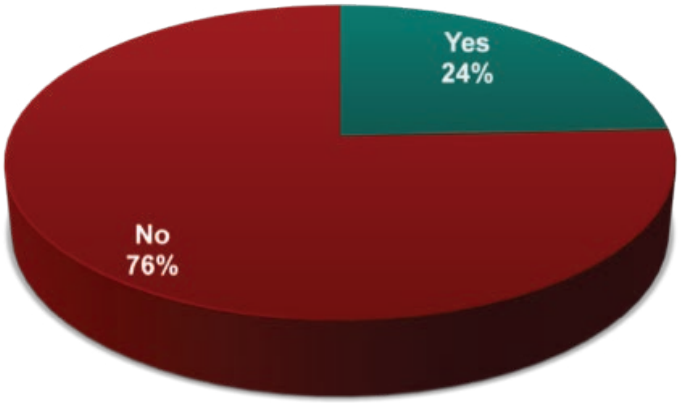
17. When you were assigned to other commands, did you participate in similar BP/BPC activities with partner countries?

___Yes

___No

If yes, please explain. (See Figures A.56.–A.58.)

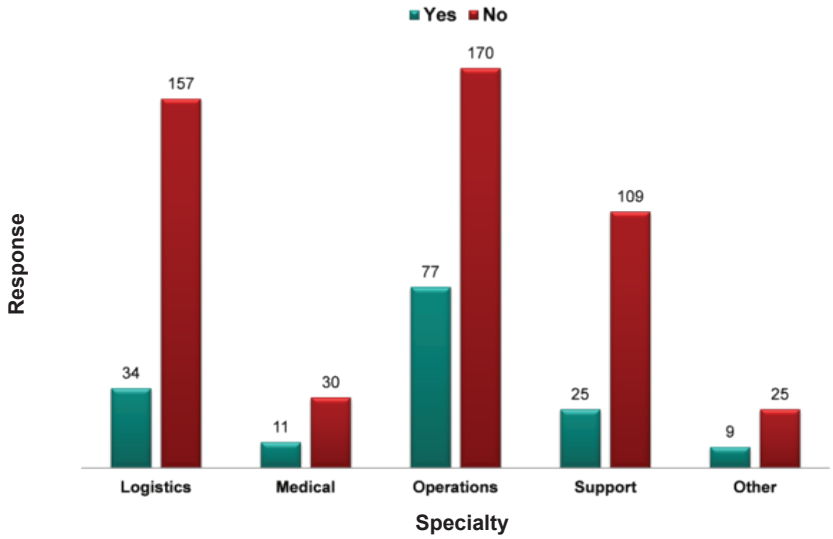
Figure A.56
Rate of Participation in Activities for Building Partnerships and Partner Capacity Before Being Assigned to U.S. Air Forces in Europe



NOTE: The survey item read, "When you were assigned to other commands, did you participate in similar BP/BPC activities with partner nations?"

RAND *TR1241-A.56*

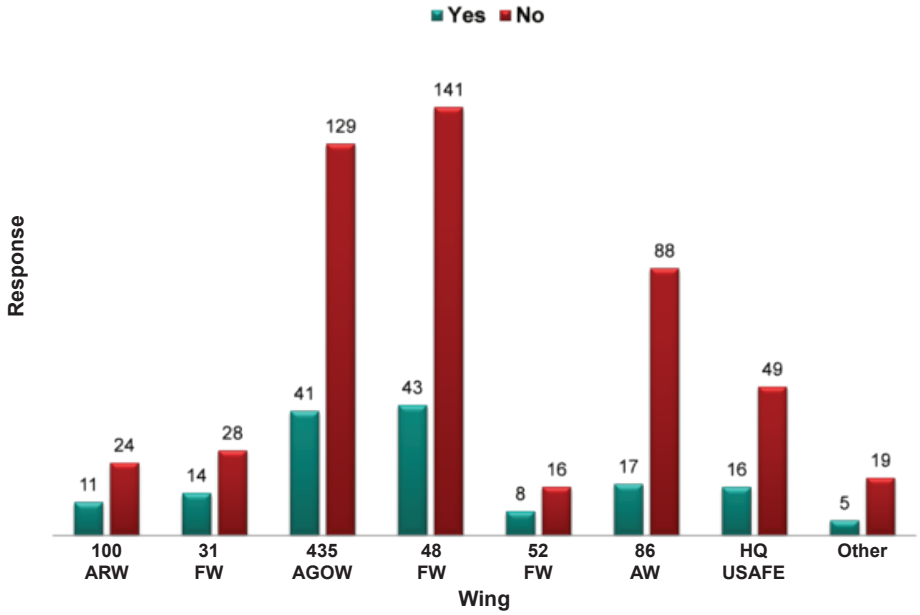
Figure A.57
Rate of Participation in Activities for Building Partnerships and Partner Capacity Before Being Assigned to U.S. Air Forces in Europe, by Specialty



NOTE: The survey item read, "When you were assigned to other commands, did you participate in similar BP/BPC activities with partner nations?"

RAND *TR1241-A.57*

Figure A.58
Rate of Participation in Activities for Building Partnerships and Partner Capacity Before Being Assigned to U.S. Air Forces in Europe, by Wing



NOTE: The survey item read, "When you were assigned to other commands, did you participate in similar BP/BPC activities with partner nations?"

RAND *TR1241-A.58*

18. Do you have any other insights you would like to share regarding building partnerships with and capacity of countries in the EUCOM AOR?

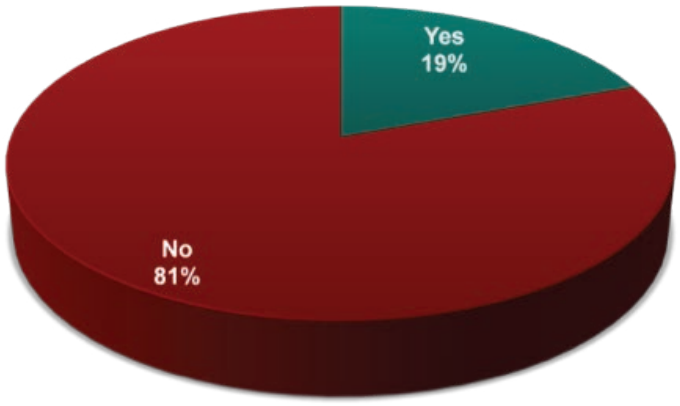
If you are a commander or supervisor of a flight or squadron, or a branch or division chief or director on the HQ staff, please answer the following questions:

19. Have you or your unit or division ever needed to postpone or cancel currency training for yourself or your unit—or have the training requirements been waived—because of BP event taskings? (See Figures A.59–A.61.)

___Yes

___No

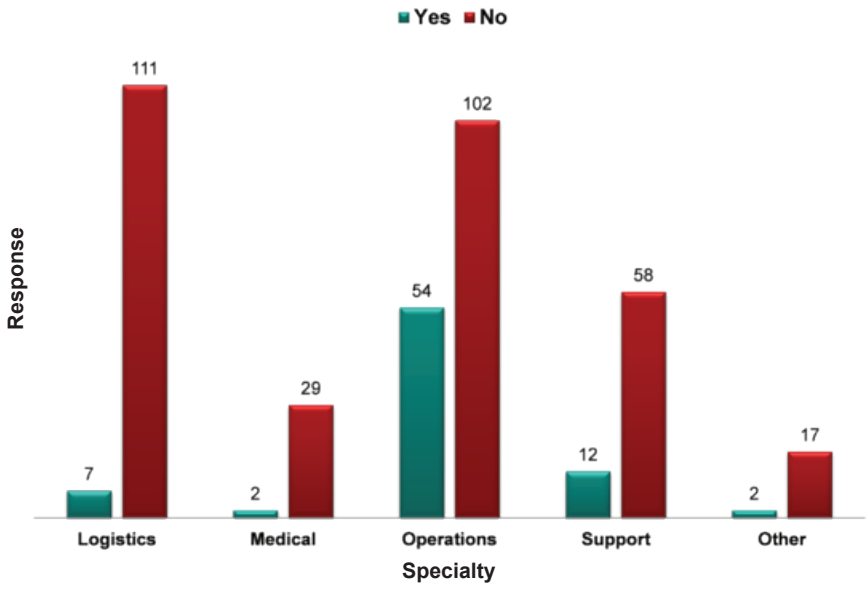
Figure A.59
Partnership-Building or Partner Capacity–Building Event Taskings' Probability of Canceling or Postponing Currency Training



NOTE: The survey item read, "Have you or your unit or division ever needed to postpone or cancel currency training for yourself or your unit, or have the training requirements been waived because of BP event taskings?"

RAND *TR1241-A.59*

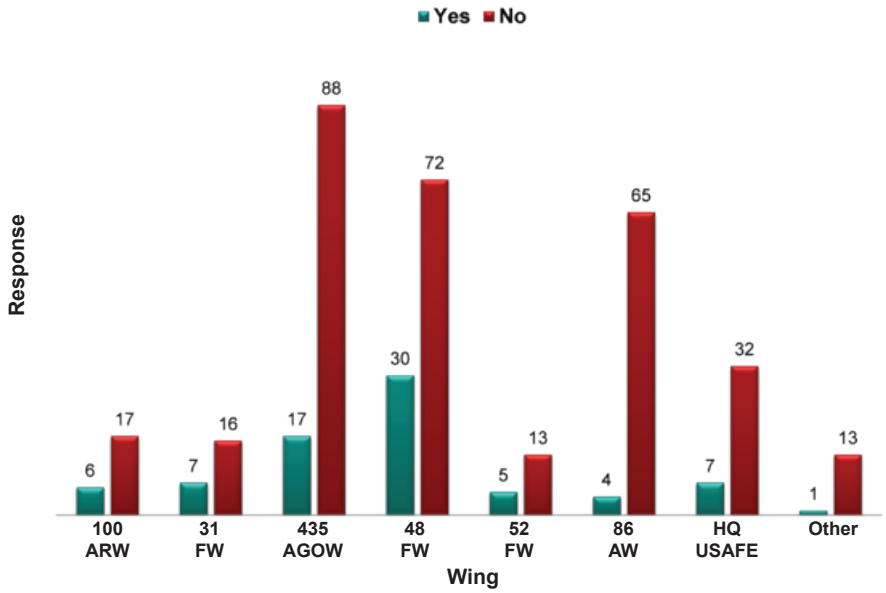
Figure A.60
Partnership-Building or Partner Capacity–Building Event Taskings' Probability of Canceling or Postponing Currency Training, by Specialty



NOTE: The survey item read, "Have you or your unit or division ever needed to postpone or cancel currency training for yourself or your unit, or have the training requirements been waived because of BP event taskings?"

RAND *TR1241-A.60*

Figure A.61
Partnership-Building or Partner Capacity–Building Event Taskings' Probability of Canceling or Postponing Currency Training, by Wing



NOTE: The survey item read, "Have you or your unit or division ever needed to postpone or cancel currency training for yourself or your unit, or have the training requirements been waived because of BP event taskings?"

RAND *TR1241-A.61*

20. If yes, how often, on average, do you or your unit or division need to postpone or cancel currency training or have the training requirements been waived due to BP/BPC event taskings? (See Figures A.62–A.64.)

___Less than once a year

___Once a year

___Once every 6 months

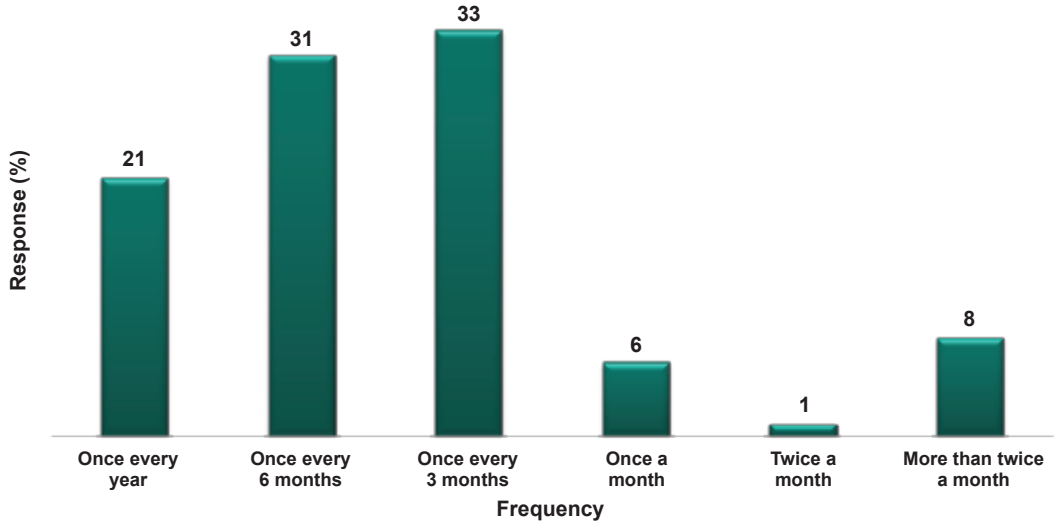
___Once every 3 months

___Once a month

___Twice a month

___More than twice a month (please specify)

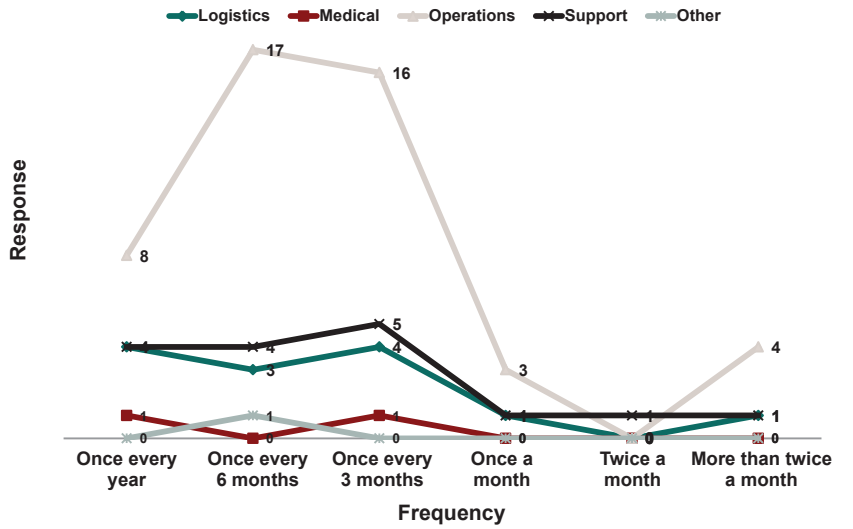
Figure A.62
Frequency of Currency Training Cancellation Due to Event Tasking for Building Partnerships and Partner Capacity



NOTE: The survey item read, "Have you or your unit or division ever needed to postpone or cancel currency training for yourself or your unit, or have the training requirements been waived because of BP event taskings? If yes, how often on average do you or your unit or division need to postpone or cancel currency training or have the training requirements been waived because of BP/BPC event taskings?"

RAND *TR1241-A.62*

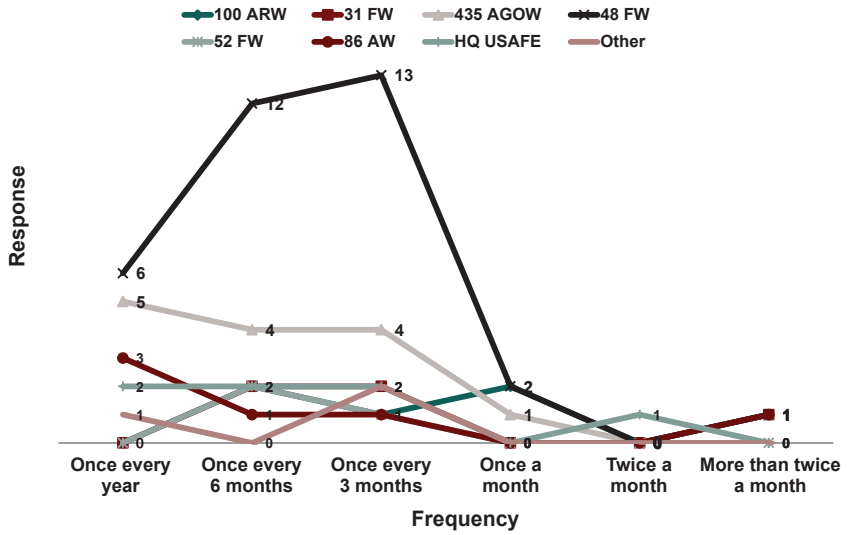
Figure A.63
Frequency of Currency Training Cancellation Due to Event Tasking for Building Partnerships and Partner Capacity, by Specialty



NOTE: The survey item read, "Have you or your unit or division ever needed to postpone or cancel currency training for yourself or your unit, or have the training requirements been waived because of BP event taskings? If yes, how often on average do you or your unit or division need to postpone or cancel currency training or have the training requirements been waived because of BP/BPC event taskings?"

RAND *TR1241-A.63*

Figure A.64
Frequency of Currency Training Cancellation Due to Event Tasking for Building Partnerships and Partner Capacity, by Wing



NOTE: The survey item read, "Have you or your unit or division ever needed to postpone or cancel currency training for yourself or your unit, or have the training requirements been waived because of BP event taskings? If yes, how often on average do you or your unit or division need to postpone or cancel currency training or have the training requirements been waived because of BP/BPC event taskings?"

RAND *TR1241-A.64*

21. How many manpower authorizations does your organization have?

    ___Authorized (spaces) in your organization

    Average response was 363.

22. How many personnel are actually assigned to your organization?

    ___Assigned (faces) to your organization

    Average response was 334.

23. BP/BPC activities require resources, including personnel and equipment from your organization. If BP/BPC activities in any way delay or inhibit the ability of your organization to maintain readiness, about how many more *personnel* should your organization have assigned to be able to conduct BP/BPC activities without affecting day-to-day operations and training, including on-the-job training (OJT)?

    ___More who should be assigned to your organization

    Average response was 10.2 more personnel; equal to a 3-percent increase in total manpower per organization.

24. What additional *equipment* should your organization have, if any, to enable you to conduct BP/BPC activities without affecting day-to-day operations and training, including OJT?

APPENDIX B

Operating-Cost Comparisons

The purpose of this appendix is to calculate operating costs for USAFE's wings and compare them with those of comparable wings in CONUS. Our aims are twofold. First, we need to accurately calculate the cost per flying-hour for each USAFE MDS to feed the building-block calculations in Chapter Three. Second, when entering a larger discussion of the value of posturing forces in CONUS versus USAFE to perform BP, we want to accurately capture any cost differences to operate like aircraft in either AOR.

Air Force Operating-Cost Data

To perform our cost comparisons, we queried data from the AFTOC database, the standard database for performing this kind of cost analysis. We made two types of cost comparisons.

First, we compared the flying-hour costs to see whether operating aircraft in USAFE costs more or less than in CONUS. Some costs, such as fuel, training munitions, and repair parts, vary with the number of flying-hours. In the second case, we compared the nonflying costs of USAFE wings with those of CONUS wings. Such costs as personnel, facilities, and some depot maintenance costs are not driven by flying, so we amortize them differently. We walk through some detailed cost and usage metrics in the succeeding sections with some overall conclusions about relative operating costs.

In order to accurately separate flying costs from other costs, we looked to the AFTOC database to address its cost elements. Table B.1 shows our results.

In Table B.1, we show some of the granular cost categories in the AFTOC database. AFTOC divides its cost data into six broad categories, called Cost Analysis Improvement Group (CAIGs). These CAIGs are further divided into levels 2, 3, and 4. At level 4, the lowest level, there are 72 categories. We assigned each cost category to either a flying-hour group or aircraft group. Costs in the flying-hour group vary mostly by the total flying-hours flown. We therefore amortize these total costs across the total flying-hours for an MDS. Costs in the aircraft group vary mostly by other factors, such as the size of the unit. For our analysis, we amortize these costs according to the number of total aircraft inventory (TAI) owned by that unit.[1]

A couple of important caveats are necessary here. First, costs that vary with aircraft usage do not all vary linearly with flying-hours. Some costs, such as aviation fuel, vary relatively linearly with flying-hours, but training sorties can have very different profiles, in which aircraft

[1] Aircraft TAI are drawn from the Logistics, Installations and Mission Support–Enterprise View (LIMS-EV) online database.

Table B.1
Air Force Total Operating-Cost Elements

CAIG Level 1	CAIG Level 2	CAIG Level 3	CAIG Level 4/ Description	Flying-Hours	Aircraft
Unit personnel					x
Unit operations	Operating material	Energy (fuel, POL, electricity)	Aviation fuel	x	
			POL	x	
			Electricity		x
		Training munitions and expendables	Training munitions and expendables	x	
			Other operations material		x
	Support services				x
	TDY				x
Maintenance	Organizational maintenance and support		Consumables	x	
			Repair parts	x	
		DLRs	Flying DLRs	x	
			Nonflying DLRs		x
		Contract maintenance services			x
				N/A	N/A
	Depot maintenance	Government depot repair	Aircraft		x
			Missile		x
			Engine	x	
			Other	x	
		Contractor depot repair	Aircraft		x
			Engine	x	
			Other	x	
Sustaining support					x
Continuing system improvements					x
Indirect support					x

NOTE: POL = petroleum, oil, and lubricants.

operate at different speeds, using different maneuvers. Flying an aircraft aggressively for one hour could burn significantly more fuel than a less aggressive hour of flying. Further, spare-parts consumption does not vary perfectly linearly with flying-hours. Again, sorties themselves can differ, but the modes of wear and failure for different spare parts can vary by hours of usage,

calendar time (for failure modes involving corrosion), or number of sorties (e.g., the turning off and on of an item, such as an engine or electronic part). CPFH is not a perfect metric.

Second, nonflying operating costs do not vary totally *independently* of flying-hours. Regression analysis of AFTOC data showed that flying-hours do have a small but nontrivial effect on some nonflying costs, but these costs are driven primarily by factors other than aircraft usage. AFTOC is the standard Air Force data source for this type of cost analysis, and we use accepted methods for parsing these costs, but we must accept some of the limitations of doing this kind of cost analysis up-front. We now discuss these cost comparisons.

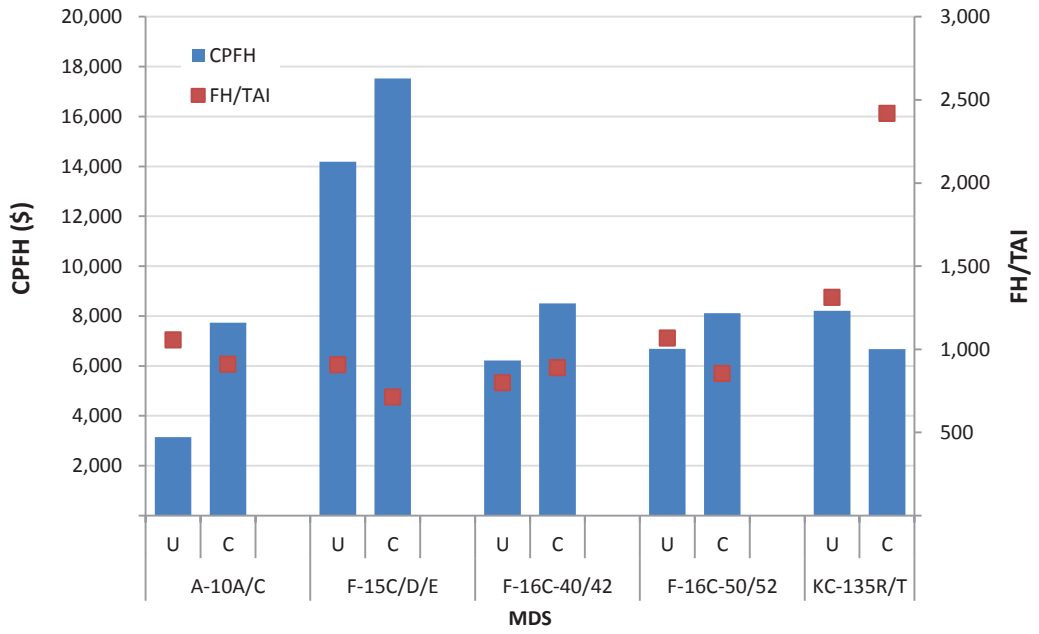
Flying Costs

Flying-Hour Costs Differ Between U.S. Air Forces in Europe and Continental U.S. Wings

Figure B.1 shows CPFH and aircraft usage for USAFE and CONUS wings for five MDSs.

In Figure B.1, the x-axis shows five groupings of MDS for aircraft operated in USAFE and CONUS. (For CAF platforms, we included ACC costs for CONUS; for the KC-135, we included AMC costs for CONUS.) The third set shows data for the F-16C Block 40/42, also known as the CG; the fourth set shows data for the F-16C Block 50/52, also known as the CJ, or high-speed antiradiation missile (HARM) shooter. We excluded the two-seater F-16D, a trainer, of which USAFE only has a few. Each pair of columns shows data for both USAFE and CONUS. The columns, tied to the y-axis on the left, show CPFH; the dots, tied to the y-axis on the right, show flying-hours per TAI (FH/TAI). The TAI metric shows the relative amount of flying each aircraft gets in a time period. All data are for 2008–2010.

Figure B.1
Flying-Hour Cost and Usage Comparisons Between U.S. Air Forces in Europe and the Continental United States



NOTE: U = USAFE; C = CONUS.

RAND *TR1241-B.1*

We observe a few things on this chart. First, all the CAF platforms have lower CPFH in USAFE by a significant margin. Second, nearly all the CAF platforms have higher FH/TAI, so they fly more hours per aircraft per year than those in ACC. Third, KC-135 CPFH is significantly higher in USAFE than in AMC. Fourth, the FH/TAI is lower in USAFE than AMC, so USAFE flies its KC-135s significantly less per aircraft (nearly half as much) than AMC. We address each of these differences in the following sections.

Why Are U.S. Air Forces in Europe's Combat Air Forces Flying-Hour Costs Less Than Air Combat Command's?

To determine why USAFE's CAF CPFH are consistently lower than ACC's, we dug deeper into the AFTOC data from which these costs are derived. Figure B.2 shows the key drivers of ACC's CAF CPFH increase over USAFE's costs. We included in this graph only cost elements that were higher for ACC than USAFE (which was most of them).

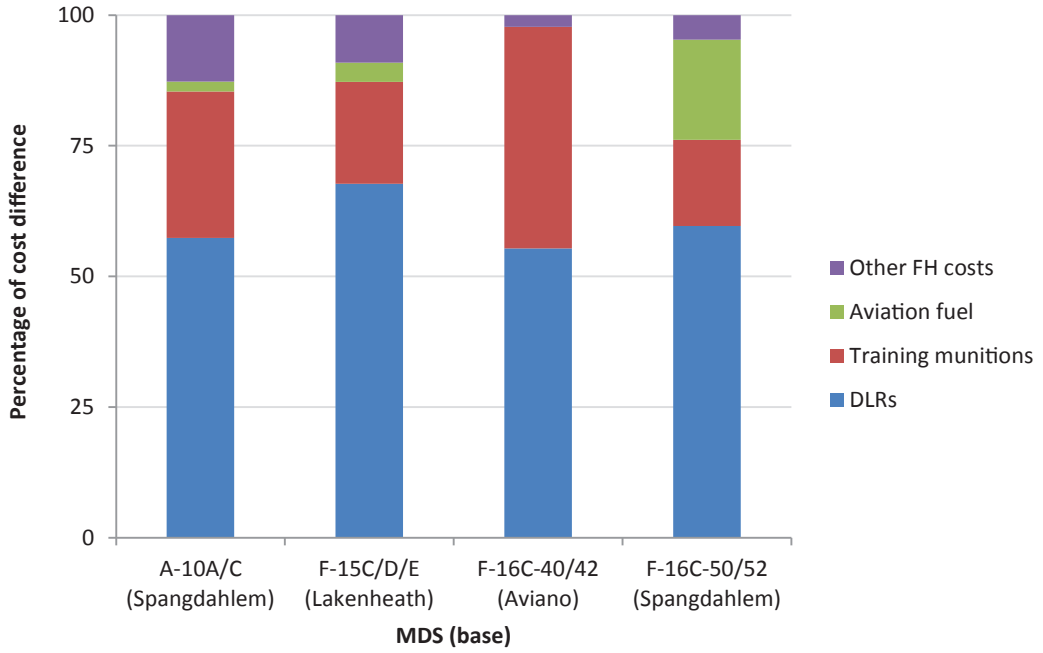
In Figure B.2, the x-axis shows each MDS grouping for USAFE's CAF aircraft, plus the base from which each operates, for reference. The colored columns represent the percentage of the cost increase of ACC over USAFE. Flying DLRs are reparable aircraft parts that are not usually repaired at wing level (i.e., home station) but are removed, replaced, and shipped to a depot maintenance facility to be repaired. For all MDS groupings, DLR costs drove about 55 to 65 percent of the cost differential, training munitions drove about 20 percent, and aviation fuel and other costs drove the remainder. For the F-16C Block 40/42, training munitions drove nearly half the cost difference, and, for the Block 50/52, aviation fuel drove a more significant portion than for the other MDSs.

On the whole, the per-unit costs of fuel, DLRs, and training munitions should not vary significantly between ACC and USAFE.[2] We explored five possible explanations as to why USAFE's CPFH for these categories are lower: differences in aircraft operation, differences in reporting, differences in fault observation, nonlinearity of spare-parts failure, and differences in deterioration mechanisms.

We draw our first three hypotheses from past research on air operations supporting Operations DESERT SHIELD and DESERT STORM. Pyles and Shulman (1995) analyzed spare-parts consumption during these two operations and observed markedly higher consumption rates for several fighter MDSs during combat than during garrison operations (Pyles and Shulman, 1995). During those operations, F-15Cs experienced significantly more failures per aircraft than those in garrison. The authors reported that (1) those pilots probably utilized threat-related subsystems to the fullest, turning on and operating subsystems that may not have been exercised as much in garrison, and (2) those pilots were probably "scrupulous about ensuring that all aircraft subsystems were operating at their fullest potential" (Pyles and Shulman, 1995)—i.e., they reported errors they might not have in garrison. The first point suggests they *operated* the aircraft differently, causing more faults by increased usage; the second point suggests they had reason to *report* more faults than they might otherwise. In the same analysis, Pyles and Shulman observed that F-16Cs and EF-111As operated with more restrictions in the war than in garrison and that they generally observed (and therefore reported) fewer faults than during garrison operations.

[2] Our AFTOC data showed no systematic difference even in fuel CPFH between CONUS and USAFE, which one might expect given regional fuel price differences. There may be an actual difference in fuel costs that AFTOC does not reveal.

Figure B.2
Drivers of Flying-Hour Cost Differences Between U.S. Air Forces in Europe and Air Combat Command



RAND *TR1241-B.2*

The third hypothesis is that, in some conditions, faults may be more or less observable. Pyles and Shulman reported that, before deploying, the F-111s tested their electronic countermeasure (ECM) gear and observed an increase in breaks. "Once combat operations began and the Iraqi Air Defense System became less active, aircrews received little feedback on their airborne jamming effectiveness, so break rates diminished again" (Pyles and Shulman, 1995). So, the F-111s may have experienced the same (or similar) failures of their ECM gear, but, because there was no one to report back to them their ECM effectiveness, they could not observe it themselves.

Our fourth hypothesis is that spare-parts failures do not increase exactly linearly with increased flying-hours, which we explained earlier in this appendix. So, as an aircraft flies more hours per year, the breakage and therefore consumption of DLRs slows in proportion to flying-hours (i.e., the DLR consumption increases sublinearly).

The final hypothesis is that the conditions in USAFE could differ in a way that affects the spare-parts deterioration mechanisms. As we stated earlier in this appendix, parts failure can be driven by usage, calendar time, or other factors. A damper or saltier environment could cause faster deterioration or wear of parts than a drier, cleaner environment.

Considering these hypotheses in light of what we already know of USAFE's operations and environment, we find two of them to be most compelling: differences in operation and nonlinear parts failure. We explain why.

We found two plausible reasons that USAFE could operate its aircraft differently than ACC. First, USAFE pilots and maintainers could be more experienced than those in ACC. This is a tempting explanation because more-experienced pilots would likely need different (and probably less-aggressive) training, and they would drop fewer training munitions.[3] More-experienced maintainers would likely remove fewer DLRs because they would be more able to properly diagnose problems, and, if they did remove a DLR, they would arguably be more able to fix that DLR at home station rather than sending it to depot and incurring that additional cost.

To explore this, we analyzed Air Force personnel data to assess potential grade and skill differences between USAFE and ACC but found no compelling difference in assigned personnel between USAFE and ACC.[4] We compared fighter pilot grades and enlisted maintainer grades and skills. USAFE's fighter pilots actually appear to be a little less experienced than ACC's (slightly more O-3s and slightly fewer O-4s and O-5s). USAFE's maintainers show almost identical grade distributions to ACC. Regarding skill level, USAFE's maintainers were ever so slightly more experienced. For one Air Force specialty code (AFSC), aerospace maintenance (2A5), USAFE had significantly more 7-levels than ACC and fewer 3-levels, possibly enough to cause an observable difference in maintenance actions.[5]

Ultimately, USAFE pilots and maintainers could be exhibiting the behaviors we list above, even if they were not due to a difference in experience. We are unable to determine this conclusively.[6]

The second and more plausible explanation for USAFE operating its aircraft differently than ACC is the known restrictions in western Europe for operating military aircraft. It could be that the ranges most immediately available to USAFE's wings do not enable them to fly the same maneuvers they normally would, making for less strenuous sorties (and thus lower DLR failure). Also, many of the subsystems that contribute to DLR consumption are ECM and other electronics. It is plausible that the countries where USAFE forces are based place restrictions on the use of these subsystems (because of their proximity to densely populated areas), leading to fewer failures of these subsystems (similar to the Operation DESERT STORM example).

One final explanation is the sublinear failure of DLRs. If USAFE units fly more hours per year per aircraft, parts costs would be amortized over a larger number of hours. This is essentially what we found. Figure B.3 shows the differences between USAFE and ACC for FH/TAI and DLR CPFH.

In Figure B.3, the left column in each pair shows the FH/TAI of USAFE over ACC. So for the A-10A/C, the column shows a positive 16-percent difference. That means that USAFE flew its A-10s about 16 percent more flying-hours per aircraft than ACC during our observed time period. The right column shows the DLR CPFH difference from USAFE to ACC. For the A-10, USAFE's listed DLR CPFH was 76 percent less than ACC's.

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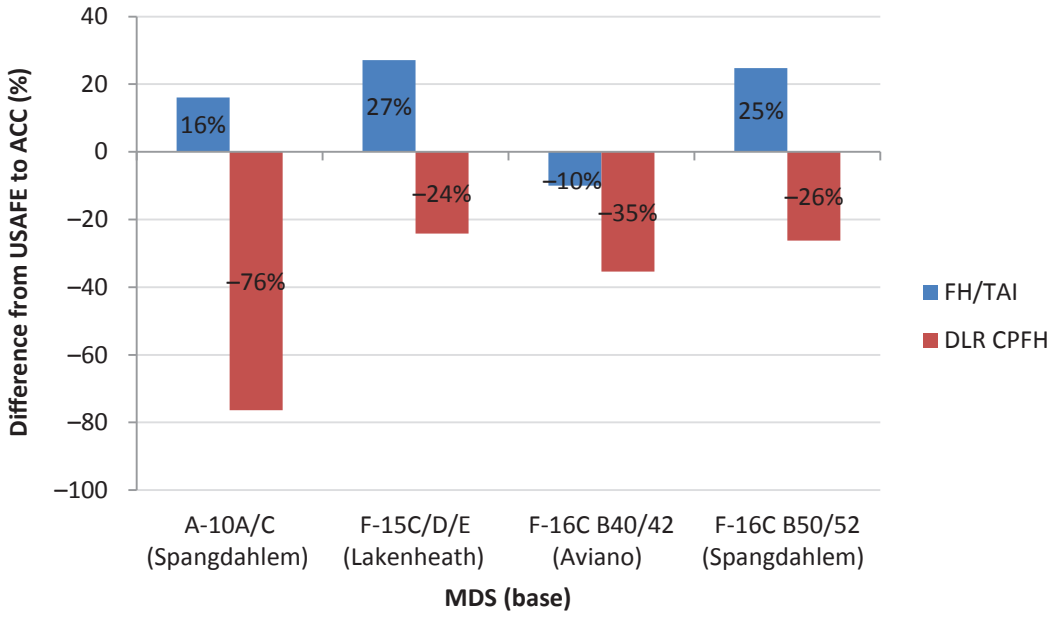
[3] It is also possible that more-experienced pilots might have a higher tolerance for minor subsystem faults and would not report them as readily as a less experienced pilot might.

[4] Air Force personnel data, calendar year 2009.

[5] One could analyze depot maintenance data to pinpoint actual demand from each wing, but such analysis was outside the scope of this research.

[6] When forces actually deploy to expeditionary operating locations (not just to forward-positioned garrison bases), they usually take more-experienced personnel.

Figure B.3
Differences Between Flying-Hours and Depot-Level Reparable Costs per Flying-Hour



RAND *TR1241-B.3*

In three out of four cases, the FH/TAI is higher and the DLR CPFH lower. We could argue here that USAFE units must fly farther to usable ranges and thus incur a penalty for each sortie to transit to and from these ranges. It is true that, to do some training, CAF units in western European bases must travel to eastern European ranges. Our building-block analysis suggests that the deployment or redeployment penalty would be on the order of 1 percent of flying-hours, not 20 percent.

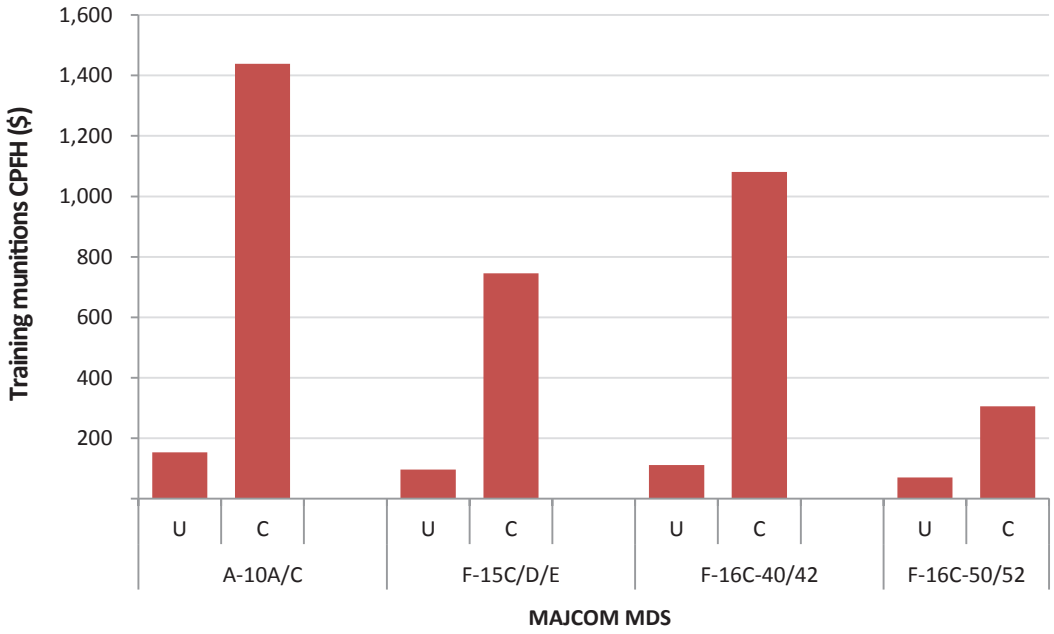
On the other hand, the F-16C Block 40/42, at Aviano, has lower FH/TAI and DLR CPFH. One might expect the lower FH/TAI to produce a higher DLR CPFH, but it does not in this case. For some aircraft, longer sorties may play a role in the increased annual flying-hours and decreased CPFH, but that does not seem to consistently explain the variation between USAFE and ACC.

We show one final comparison. Recall from Figure B.2 that training munitions constituted about 20 percent of the lower CPFH for USAFE units relative to ACC. Figure B.4 shows the munitions CPFH figures for these same units.

In Figure B.4, the x-axis shows four CAF MDSs we have been discussing. Each pair of columns shows data for both USAFE and CONUS. The columns, tied to the y-axis on the left, show only the CPFH for training munitions.

USAFE's CPFH for training munitions is, in most cases, an order of magnitude less than ACC's. For the F-16C Block 50/52, USAFE's costs are about one-quarter of ACC's. The higher FH/TAI would mitigate that difference some, but there appears to be some significant operational difference between the two MAJCOMs. HQ USAFE personnel confirmed that USAFE CAF pilots use significantly fewer munitions than their ACC counterparts do because of Euro-

Figure B.4
Training Munitions Cost per Flying-Hour



NOTE: U = USAFE; C = CONUS.
RAND *TR1241-B.4*

pean range restrictions. They informed us that, to return to full readiness before a deployment, USAFE CAF pilots visit RED FLAG to fully requalify to fire required munitions.[7]

All things considered, we consistently observe a lower CPFH for these CAF aircraft in USAFE than at ACC.[8] We now address the question of why the KC-135 CPFH is significantly more expensive in USAFE than CONUS.

Why Are U.S. Air Forces in Europe's KC-135 Flying-Hour Costs Higher Than Air Mobility Command's?

Again, we dug more deeply into the AFTOC data to see what drove the cost differences. Figure B.5 shows the key drivers of USAFE's KC-135 CPFH increase over AMC. We included only those cost categories for which USAFE's costs were higher than AMC's.

As shown in Figure B.5, engine and DLR consumption are each about 40 percent of the cost increase, repair parts (non-DLRs) another 10 percent, and other costs another 10 percent. Can flying-hours explain the difference in parts consumption? Figure B.6 shows the difference between USAFE and AMC for KC-135 FH/TAI, flying DLR CPFH, and engine CPFH.

In Figure B.6, each column shows the difference in the metric comparing USAFE with AMC. For the leftmost column, USAFE's KC-135 FH/TAI was 46 percent lower than AMC's for our observed time period. USAFE's DLR and engine CPFH were 89 percent and 97 percent higher than AMC's, respectively. Roughly speaking, USAFE flew its KC-135s about half

[7] Teleconference on September 30, 2011, with USAFE/A5I personnel.

[8] For argument's sake, we also amortized the flying-hour costs across each wing's aircraft to see whether the net cost that USAFE incurred per aircraft per year differed. We found that, when flying-hour costs were amortized across aircraft, USAFE's costs either were a wash with ACC or were significantly less expensive, confirming our other findings.

Figure B.5
Drivers of Higher U.S. Air Forces in Europe KC-135 Flying-Hour Costs

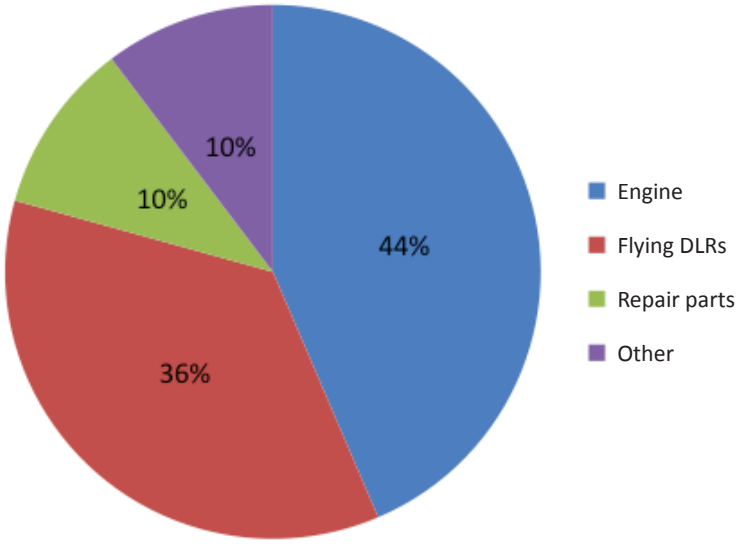


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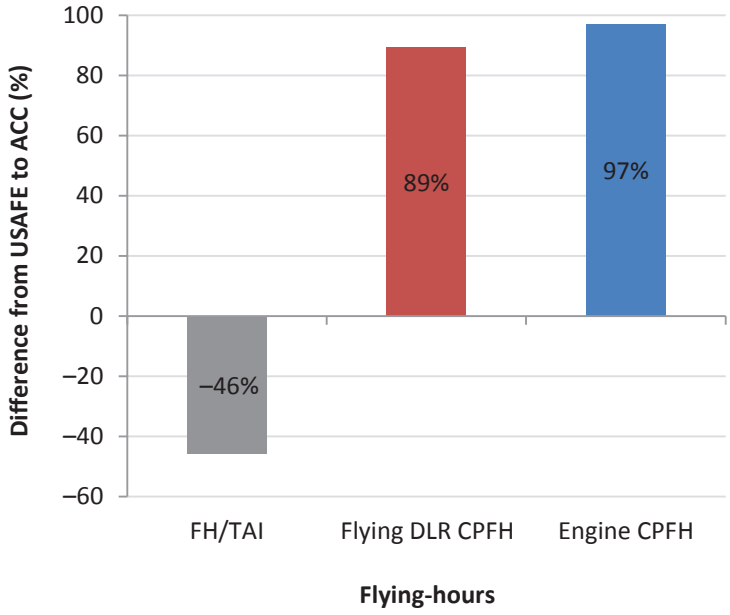
Figure B.6
Higher KC-135 Flying-Hour Costs in U.S. Air Forces in Europe Correlate to Fewer Flying-Hours Per Aircraft



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as many hours per aircraft and consumed about twice as many flying DLRs per flying-hour. As with our earlier discussion, one could argue that DLR and engine consumption do not vary linearly with flying-hours.

Does USAFE fly shorter sorties than AMC? We do know that, in calendar year 2010, USAFE's average KC-135 sortie duration was about 4.3 hours.[9] We do not know the value of AMC's KC-135 average sortie duration. Ultimately, correlation does not necessarily mean causation, but this seems like a reasonable explanation in light of our discussion earlier about the sublinear increase in parts failures.

Another possible explanation could be an increased operation of and reporting of failures for certain electronic subsystems. Europe has more-restrictive regulations for collision avoidance than the United States, as well as higher density of air traffic in some areas. We know from our analysis that the 100 ARW regularly travels to other countries to do tanking missions with PNs (Chapter Two notes that the 100th engaged with 22 different nations during the year we analyzed), and they would traverse several countries for many of these trips. It could be that these KC-135s operate subsystems involving collision avoidance or types of navigation more than they would in the United States and that they more fastidiously report failures to ensure that these systems meet the stringent standards Europe requires. It is unlikely that differences in operations would explain the entire scale of the CPFH differences, but it could feasibly contribute.[10]

We have thus far addressed flying-hour costs. We now turn our attention to nonflying operating costs, such as personnel and base support.

Nonflying Costs

How Do U.S. Air Forces in Europe's Nonflying Operating Costs Compare with Those in the Continental United States?

Figure B.7 shows the AFTOC nonflying costs and TAI for each command.

In Figure B.7, the x-axis shows five groupings of MDS for aircraft operated in USAFE and CONUS, the same as Figure B.1 earlier in this appendix. Each pair of columns or dots shows data for both USAFE and CONUS. The columns, tied to the y-axis on the left, show cost per aircraft in millions of dollars; the dots, tied to the y-axis on the right, show TAI.

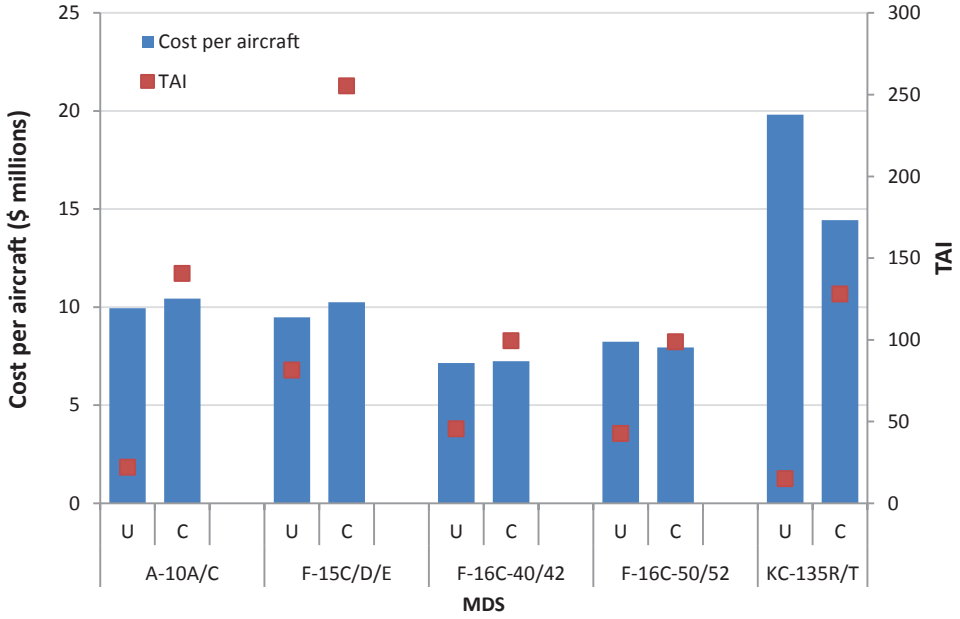
We observe several things here. First, for CAF aircraft, USAFE operates significantly fewer aircraft of each MDS than does ACC, which is no surprise. Second, the nonflying operating costs per aircraft are very similar between the two commands. When we look at the CAF aircraft, we find that the percentage difference between the two commands is in the single digits, and, in one case, USAFE's costs are marginally higher than ACC (F-16C Block 50/52).

One might expect higher costs in USAFE than in ACC for some MDSs because most fighter wings have 72 aircraft, but most of USAFE's CAF wings have fewer than that. Thus, ACC's basing arrangements are arguably more efficient and should be less expensive per air-

[9] Sortie data were derived from 100 ARW annual sortie records in a spreadsheet provided by 100 ARW personnel via email in August 2011.

[10] For argument's sake, we also amortized the flying-hour costs by aircraft to see whether the net cost that USAFE incurred per aircraft per year differed. We note that, when amortized this way, the net annual flying-hour cost per aircraft was 50 percent *less* in USAFE than in AMC.

Figure B.7
Nonflying Costs and Total Aircraft Inventory Comparison Between U.S. Air Forces in Europe and the Continental United States



NOTE: U = USAFE; C = CONUS.

RAND *TR1241-B.7*

craft. This supposed difference could be offset by cost-sharing arrangements that USAFE has with its host-nation governments, but we cannot establish that from the available data.[11] Ultimately, the cost differences for these CAF aircraft are in the tens of millions of dollars per year. To put that in perspective, we note that the total nonflying costs for these CAF aircraft in USAFE is about $1.7 billion.[12]

The outlier in Figure B.7 is again the KC-135. Here, we can see that the KC-135's nonflying cost per aircraft is significantly higher in USAFE than in AMC.

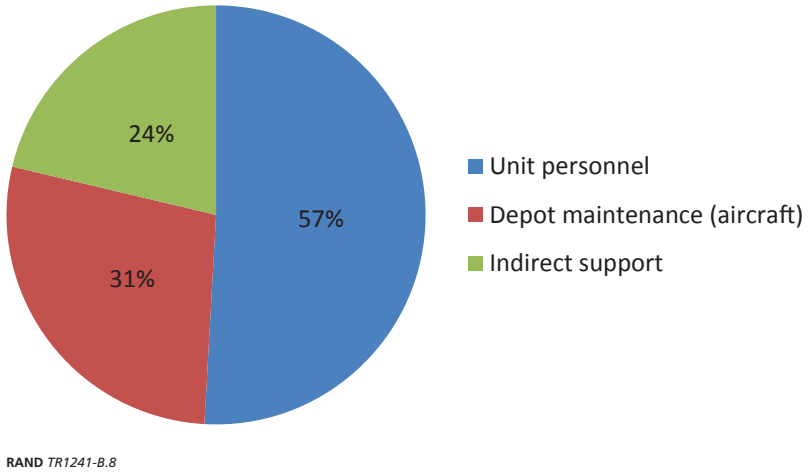
Why Are U.S. Air Forces in Europe's KC-135 Non–Flying-Related Costs Higher Than Air Mobility Command's?

Figure B.8 shows the drivers of higher USAFE KC-135 per-aircraft costs. Here, we see that higher nonflying costs are driven primarily by unit personnel, then by depot maintenance (aircraft costs), then by indirect support. *Unit personnel* includes all personnel associated with the flying wing (e.g., operations and maintenance groups). *Depot maintenance* includes depot costs that are not associated with flying-related consumables. This could include the labor necessary for inspections, wiring replacement, or corrosion repair. *Indirect support* includes primarily base operating support and some medical and administrative personnel costs.

[11] During the course of this research, HQ USAFE personnel reported that USAFE benefits from donated land and cost-sharing arrangements that help defray some of its operating costs, but we do not know their scope.

[12] As a side note, Spangdahlem has two different MDSs, the A-10 and F-16C Block 50. The cost difference for these two—the A-10 lower in USAFE and the F-16C Block 50 higher—is essentially a wash.

Figure B.8
Drivers of Higher U.S. Air Forces in Europe KC-135 Per-Aircraft Costs



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It is not clear why per-aircraft depot maintenance costs would be so much higher for USAFE aircraft than for AMC aircraft (USAFE's related depot cost per aircraft is fully 42 percent higher than AMC's). Generally, depot maintainers go through the same inspections for each aircraft, incurring essentially the same labor costs. USAFE's aircraft could be subject to more corrosion because of their operating environment (located about 30–50 miles from the coast), it could be that they are older and incur more costs to replace some parts or remedy corrosion.

Unit personnel and indirect support cost differences may have a more obvious explanation. USAFE operates only 15 KC-135s, and it is the only flying USAFE unit at RAF Mildenhall.[13] The 100 ARW supports these aircraft alone and has its own operations, maintenance, and mission support groups. Thus, one squadron of aircraft bears the cost of all these groups. AMC's KC-135s are usually based with several squadrons, so those wings' support costs are amortized across many more aircraft.

We might be tempted to look to Pacific Air Forces (PACAF), which also only has one squadron of KC-135s, to see whether its per-aircraft costs are similarly high. They are not. But PACAF's KC-135s are bedded down at Kadena AB, which has four other flying squadrons on base, thus spreading out its mission support and other costs across more squadrons. We could argue, then, that USAFE's per-aircraft KC-135 costs are high primarily because they are bedded down relatively inefficiently.

Concluding Thoughts

We went through the exercise of comparing operating costs between USAFE and CONUS for two reasons. First, we sought to accurately portray USAFE's CPFH statistics to feed our BP building-block calculations for each wing. In Chapter Three, we use the CPFH numbers shown in this appendix.

[13] The figure of 15 KC-135s in USAFE is an average number of TAI owned per year for 2008–2010, taken from the LIMS-EV database.

The second reason is to feed a larger discussion of the relative costs, benefits, and risks of performing BP from forward-positioned forces in USAFE versus doing them from CONUS. In our cost analysis, we observed significant cost differences between USAFE and CONUS, and, in the preceding discussion, we sought to explain them the best that we could. Some differences have fairly strong explanations; others are not as easily explained. But these cost differences do, in fact, exist, and they held true even when we varied some of the parameters in our analysis, such as the time span we observed.

In a larger discussion about the value of forward-positioned forces, a fair question is this: If some of USAFE's forces were actually repositioned to CONUS, how would operating costs change? In Chapter Three, we analyze the direct costs of performing BP from USAFE and CONUS, but, from a total cost perspective, those direct BP costs are a fraction of the total operating cost of those units. Because we observed markedly different operating costs between USAFE and CONUS (for flying and basing aircraft), it is fair to ask what the total cost would be for actual posture changes. We take up this question at the end of Chapter Three and use the operating costs assessed in this appendix.

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